# FLIGHT

and The AIRCRAFT ENGINEER

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# The Outlook

## War

THE long period of suspense, Hitler's "war of nerves," came to an end with Britain's declaration of war on Germany on Sunday morning last, September 3. There is no doubt that the most general feeling among British people was one of relief that the die had been cast and all uncertainty was over. War is horrible, as all who remember the last know well enough, but there is one thing worse than war, and that is to be unwilling to fight for one's principles.

Last September war was avoided, and it may well be that no other course than that followed was possible for France and Britain; but none the less a sense of shame was almost universally felt. The complete suppression of Czechoslovakia followed as a matter of course, and other examples of Nazi bullying have succeeded. The time had to come when Britain and France must make a stand, and that time has now arrived. Our only regret is that we could not have made our stand in time to save the gallant Czechs. We must hope that the result of this war will see their country set free again.

If last year we were weak, now we and France are very strong, on the sea, on the land, and in the air. The resources of the world are open to the Allies who rule the waves, and our credit is almost unlimited. The righteousness of our cause not only inspires our people and our forces, but it has won the deep sympathy of the rest of the world. Last September the press of the United States could scarcely restrain its contempt for the surrender to force of France and Britain; now it whole-heartedly applauds our action and hopes for our victory. "Thrice is he armed who has his quarrel just." It is a familiar quotation, but none the less true. With reverent conviction we feel that the God of Righteousness is on our side.

## Eastern Europe

WE pay full tribute to the brave Poles who are manfully resisting the onset of the German forces. It is a strange turn of Fortune's wheel which sees Britain and Poland as allies in war, but the relation between the Poles and the French is historical. Poles fought in the armies of Napoleon. Soon we hope strong relief may be brought to that country by the forces of Britain and France, though it remains to be seen what form that help will take. At least Germany will not be able to throw the whole weight of her large army on to her eastern frontier when her two strongest foes lie on the west.

We must not forget other nations in the Near East who are bound to us in friendship, though not yet in military alliance. Turkey is a friend of the very greatest value, and she is now, thanks to the late Ataturk, a very much more formidable Power than she was during the last war. Greece is another good friend, small but very gallant in war, and the use of her harbours in the Mediterranean is an important asset. We have also guaranteed the independence of Rumania, on whose oil wells Germany has long cast covetous eyes. She possesses ports on the Black Sea which may play a vital part before the war is over. Egypt and Iraq are on our side.

Hungary and Yugo-Slavia have displayed a natural desire to remain neutral, but neither of them relishes the idea of being swallowed up by the German ogre. Of their sympathies we need have no doubt.

## The Mediterranean

AS we surmised in our last issue, Italy has not joined forces with Germany in this war. She has shown prudence, and we, for our part, are very glad not to have to fight against our old allies. Had we gone much further than we did in cutting down our Navy during the disastrous years of disarmament, things might now be very different. Fortunately we recovered wisdom just in time to save the Mediterranean, though had we started earlier, perhaps this war might not have broken out at all. We wished for peace, but we did not prepare for war, and so we now are paying in blood and treasure for disregard of the old Roman maxim. Once a reader expressed shocked horror at *Flight* for having quoted

## THE KING'S MESSAGE

*ON Sunday last, September 3, His Majesty broadcast from Buckingham Palace the following message to his peoples:—*

In this grave hour, perhaps the most fateful in our history, I send to every household of my peoples, both at home and overseas, this message, spoken with the same depth of feeling for each one of you as if I were able to cross your threshold and speak to you myself.

For the second time in the lives of most of us we are at war. Over and over again we have tried to find a peaceful way out of the differences between ourselves and those who are now our enemies. But it has been in vain. We have been forced into a conflict. For we are called, with our allies, to meet the challenge of a principle which, if it were to prevail, would be fatal to any civilised order in the world.

It is the principle which permits a State, in the selfish pursuit of power, to disregard its treaties and its solemn pledges; which sanctions the use of force, or threat of force, against the Sovereignty and independence of other States. Such a principle, stripped of all disguise, is surely the mere primitive doctrine that might is right; and if this principle were established throughout the world, the freedom of our own country and of the whole British Commonwealth of Nations would be in danger. But far more than this—the peoples of the world would be kept in the bondage of fear, and all hopes of settled peace and of the security of justice and liberty among nations would be ended.

This is the ultimate issue which confronts us. For the sake of all that we ourselves hold dear, and of the world's order and peace, it is unthinkable that we should refuse to meet the challenge.

It is to this high purpose that I now call my people at home and my peoples across the Seas, who will make our cause their own. I ask them to stand calm, firm, and united in this time of trial. The task will be hard. There may be dark days ahead, and war can no longer be confined to the battlefield. But we can only do the right as we see the right, and reverently commit our cause to God. If one and all we keep resolutely faithful to it, ready for whatever service or sacrifice it may demand, then, with God's help, we shall prevail.

May He bless and keep us all.

*Si vis pacem, para bellum.* We wonder what he thinks now.

The neutrality of Spain is another cause for thankfulness. Hitler doubtless hoped that France would have to keep a large proportion of her Army on her Pyrenean frontier, and that aerodromes in Northern Spain would be useful for air attacks on England's south coast. Gen. Franco has not been so foolish as to involve his country in a foreign war just when its disastrous civil war is over.

## *Air Power and the War*

WE do not yet know what course our strategy and tactics will take, but it is interesting to speculate on the influence which air power may have on modern war. Many believe that on the ground the defence is now so much stronger than the attack that armies will be as immobile as they were from the battle of the Aisne up to the final victorious Allied advance three years later. Some argue that tanks cannot restore mobility because the anti-tank gun will master them. Others say that these considerations will bring the aeroplane into its own, because the bomber is the ideal weapon of attack, and cannot be held back by trench systems or fortified lines. We shall perhaps see. It may turn out that the Siegfried line is not impregnable, but it may also turn out that bombers, skilfully used against the back areas of an army will immobilise it more effectually than forts or trenches can do. Certainly no war can be brought to a conclusion by simultaneous bombing raids by each side on the other with air forces of about equal strength.

Such considerations suggest a stalemate, so far as land armies are concerned. The British Navy provides the ultimate solution of such a state of affairs. We have good hopes, however, that our bomber force may be so used that it will help to make possible a speedy victory for Britain, France and Poland.

## *Bravo the R.A.F.!*

THE first announced success on the western front has been scored by the Royal Air Force. A squadron of bombers set off across the North Sea on Monday afternoon and attacked the German fleet in its harbours on the west of the Kiel Canal. A battleship lying in Schilling Roads was hit by several heavy bombs and was severely damaged, while another battleship moored at the mole at Brunsbüttel was also hit and heavily damaged. The German fleet is not really formidable in numbers, but still its "pocket battleships" might be a great nuisance if they broke free and acted as commerce raiders, and in any case the German fleet must occupy the attention of our Home Fleet. Heavy damage to two German battleships, of which there are not very many, must bring welcome relief from responsibility to our own Admirals, and adds not a little to the security of our country.

On the personal side we recognise with delight, what has never been in doubt, that the officers and airmen of the present R.A.F. are every bit as gallant as their forerunners of 1918. Some have fallen covered with honour, but they died doing glorious and useful work.

## *Civil Cessation*

JUST about twenty years ago British civil aviation began to make its first faltering strides after a four-year period of war during which the aeroplane had emerged from the purely experimental stage and had developed into a military weapon of considerable importance. Not for some years did private flying begin to assume sufficient importance for manufacturers to cater for it.

Under the stimulus given to it by Government aid to flying clubs, the small aeroplane, suitable for the private owner-pilot, began to emerge, the first really practical machine being the De Havilland Moth with 60 h.p. Cirrus engine.

Since this may well be the last issue for a long time in which *Flight* is able to deal with small civil aircraft, we have thought the opportunity suitable for a review of the state of development which the peace period of twenty years has achieved. It is interesting to speculate on where we are likely to resume when, once more, peaceful pursuits become possible. Shall we start where we left off in 1939, or shall we launch out along entirely new lines?

Some of Poland's elderly P.Z.L. P11 single-seater fighters (Mercury) with a few of the new and highly efficient Los bombers in the background.

# POLAND'S FIRST LINE

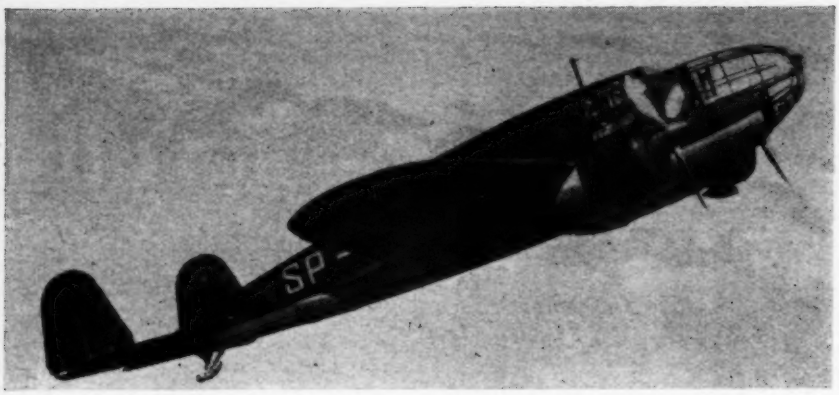
## *Sound Technical Equipment : British Technique and Engines : An Excellent Bomber*

ALTHOUGH for obvious reasons it is impossible to discuss authoritatively the strength and detail organisation of Poland's Air Force, a good deal can be said about her aircraft, largely as a result of the efforts Poland has lately been making in the export market.

The Polish Army Air Force is organised in regiments which are made up from groups; these, in turn, are formed of squadrons. The Force is equipped exclusively with Polish machines, most of which are made at the National Aircraft Factory (Panstwowe Zaklady Lotnicze), near Warsaw. A large proportion of the aircraft are fitted with Bristol engines built under licence; others have French Gnome-Rhônes.

Poland's "first-string" bomber is the P.Z.L. Los, which is comparable with our Handley Page Hampden. The Los bears the P.Z.L. works designation P.27, and is a mid-wing cantilever monoplane, the wing being of unusually low aspect ratio. The structure is entirely of metal, and the machine may be fitted with Bristol Pegasus or Gnome-Rhône 14N engines, though it is believed that all the standard machines in service with the Polish Air Force have Bristols built under licence in Poland.

Pilot's of the Polish Air Force before departing in their Los bombers. It would appear that their personal equipment, like their flying material, is of good quality. Points to note are the padded helmets and the Irvin parachute harness (including back type).



The Los (two Bristol Pegasus built under licence) is a standard bomber type of Poland's Air Force. In many respects it is comparable with our Handley Page Hampden.

Another view of the Los, showing the fine fuselage entry with its abundance of transparent panelling. The cowlings of the Pegasus engines are of unusual formation and the four-wheeled undercarriage is another unorthodox feature.

A striking feature of the Los is the generous amount of "transparency" in the nose, which houses a manually trained machine gun, the bomb sight and electrical and manual bomb releases. There is a second machine gun on top of the fuselage, and a third firing through the floor.

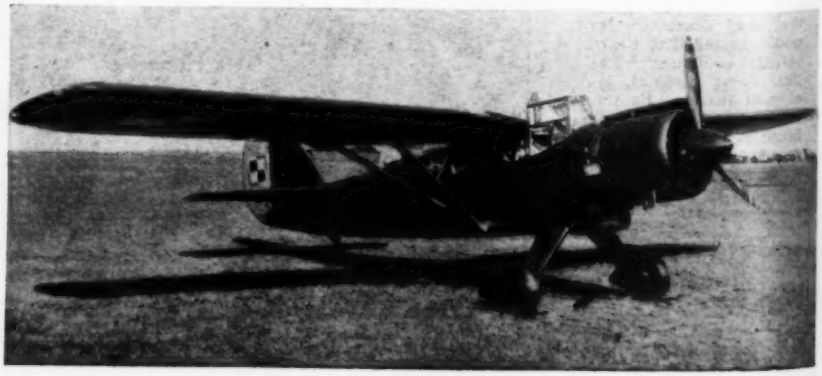
The maximum bomb load is about 5,600 lb., though this, of course, is only for very short-range work. Typical loadings would be 20 bombs of 110 lb.; 20 of 240 lb.; or two of 2,850 lb.

Fitted with Bristol Pegasus XX engines, the Los has a range of 1,365 miles when carrying about 3,850 lb. of bombs. The makers claim a top speed of over 270 m.p.h., or more than 300 m.p.h. when the latest type of Gnome-Rhône radials are specified.

For some time the Polish Air Force has used considerable numbers of P.Z.L. P.23 single-engined, general-purpose machines. The P.23 is by no means the essence of elegance in appearance, but has a useful performance when fitted with a Bristol Pegasus. The machine is designed for bombing, medium reconnaissance or ground attack work, and is normally armed with five machine guns.

A development of this type, which is believed to be in service already, is the Sum. This model has been considerably cleaned up in comparison with its forerunner, and is fitted with twin fins and rudders. The top speed is said to be over 260 m.p.h. Armament comprises six machine guns and about 1,300 lb. of bombs. Of particular interest is the retractable lower gun position which is unusually elaborate for a single-engined machine.

Standard fighter types are the P.Z.L. P.7, P.Z.L. P.11, and P.Z.L. P.24. These are all gull-winged, strut-braced monoplanes, and are fitted respectively with Jupiter, Mercury, and Gnome-Rhône K.14 engines. It is believed that the P.11 is the most commonly used type. This can be



Based on the design of the Westland Lysander the P.Z.L. Mewa (Gnome-Rhône M.14) is a standard army co-operation type.

**Powered with two Foka engines of about 450 h.p. each this neat little twin-engined fighter-dive-bomber is known as the Wilk.**

fitted with two or four machine guns, and has a performance roughly equivalent to that of the Gloster Gauntlet, the top speed being about 230 m.p.h. The P.24 is a considerably faster machine, being capable of over 265 m.p.h. The armament may comprise four 7.7 mm. machine guns or two 20 mm. Oerlikon FF shell-guns and two 7.7 mm. machine guns. Two 50 kg. bombs can also be carried.

It was learned at the Paris Show that it is intended to replace these single-engined fighters with twin-engined two-seater machines of the Wilk (Wolf) type. The Wilk is a small all-metal, low-wing monoplane which can be used as a fighter or dive-bomber. The engines (Foka) are of Polish design and construction, and are of the inverted, air-cooled vee-eight type. It is believed that they give about 450 h.p. each. When used as a fighter, the Wilk is equipped with one 20 mm. shell-gun and two machine guns (all fixed in the nose) and two free machine guns in the rear cockpit. The bomb carried when the aircraft is employed as a dive bomber weighs 660 lb.

A training machine, very much on the lines of the Wilk but fitted with two engines of 130 h.p. each, has also been built by the P.Z.L. concern. This is known as the Wyzel and was exhibited together with other current P.Z.L. types at the Paris Show.

The P.Z.L. designers have paid a great compliment to the Westland concern by following very closely the design of the Lysander for the standard Polish army co-operation machine, which is designated the Mewa. Detailed description of this machine is not necessary, as it follows Lysander practice so closely. The engine, however, is one of the small-diameter Gnome-Rhône 14Ms of about 700 h.p. Handley Page slots and flaps are fitted, and fixed machine guns are mounted in the wheel fairings.

The pilots of the Polish Air Force have a reputation for flying skill and great courage. Reports in the daily press of their engagements with German bombers include a story of a Polish pilot who deliberately rammed his adversary, though the reason given—that "his gun had jammed"—is hardly to be believed in view of the fact that the most lightly armed of the Polish fighters has two machine guns.

A German communiqué issued last Sunday states that military objectives were repeatedly attacked and destroyed and adds that at several points there was resistance by Polish anti-aircraft guns and pursuit (fighter) aircraft. The German News Agency stated that the Luftwaffe destroyed 120 Polish machines on Friday and Saturday, and up to Saturday night had lost only 21 machines.

An official Polish communiqué issued on Monday said that during the day the German Air Force carried out numerous attacks on open towns, including Warsaw, Deblin, Radom and Cracow. During the day, states the communiqué, 64 German aeroplanes were shot down. Polish losses were 11 machines.

**The top view shows the P.Z.L. P.23 general-purpose machine from which was developed the Sum (below). Both machines use a Pegasus engine and are very heavily armed.**

## Royal Aero Club: Aviators' Certificates

| No. | Name | Club or School | Date |
|---|---|---|---|
| 19,674 | Russell Edward Hamlet ... ... | Exeter Aero Club ... | 19.8.39 |
| 19,675 | Arthur Lancelot Tapper ... ... | Exeter Aero Club ... | 19.8.39 |
| 19,676 | Anne Walker ... ... ... | Hampshire Aeroplane Club | 21.8.39 |
| 19,677 | Frank Castle ... ... ... | South Staffs Aero Club ... | 21.8.39 |
| 19,678 | Herbert William Carter ... ... | Hull Aero Club ... ... | 21.8.39 |
| 19,679 | John Tremayne Ellis . ... ... | Barnstaple and North Devon Flying Club. | 21.8.39 |
| 19,680 | Alec John Brown ... ... ... | Southend Flying Club ... | 21.8.39 |
| 19,681 | John Henry Jenkins ... ... | Portsmouth Aero Club ... | 21.8.39 |
| 19,682 | William Greenwell Turnbull ... | County Flying Club ... | 21.8.39 |
| 19,683 | Robert Willis Petty ... ... | Tollerton Aero Club ... | 21.8.39 |
| 19,684 | Philip William Wears ... ... | Tollerton Aero Club ... | 21.8.39 |
| 19,685 | Reginald Noel McKenzie ... | Liverpool and Dist. Ae.C. | 21.8.39 |
| 19,686 | Edward Lyman Elliot Nicholson | Liverpool and Dist. Ae.C. | 21.8.39 |
| 19,687 | Frederick Bryce Cooper ... ... | Liverpool and Dist. Ae.C. | 21.8.39 |
| 19,688 | Robert James Urquhart ... ... | North British Aero Club . | 21.8.39 |
| 19,689 | Ronald William James Cowie ... | North British Aero Club . | 21.8.39 |
| 19,690 | Grahame Affleck Morgan ... | South Staffs Aero Club ... | 21.8.39 |
| 19,691 | Sydney Halliday ... ... ... | Redhill Flying Club ... | 21.8.39 |
| 19,692 | John Edward Cecil Crosbie ... | North of Ireland Aero Club | 21.8.39 |
| 19,693 | William Terence John Bradley ... | North of Ireland Aero Club | 21.8.39 |
| 19,694 | John Percival Metcalfe ... ... | North of Ireland Aero Club | 21.8.39 |
| 19,695 | James Simpson ... ... ... | North British Aero Club... | 21.8.39 |
| 19,696 | Eric Bertram Holden ... ... | South Staffs Aero Club ... | 21.8.39 |
| 19,697 | Gordon Houston Bayliss ... ... | South Staffs Aero Club ... | 21.8.39 |
| 19,698 | Victor Taylor Auckland ... ... | Doncaster Aero Club ... | 21.8.39 |
| 19,699 | Frederick William Stevenson ... | Tollerton Aero Club ... | 21.8.39 |
| 19,700 | Arthur John Blake ... ... | Norfolk and Norwich Ae.C. | 21.8.39 |
| 19,701 | Herbert John Nursey ... ... | Norfolk and Norwich Ae.C. | 21.8.39 |
| 19,702 | Robert Bell Dunsire ... ... | Thanet Aero Club ... | 21.8.39 |
| 19,703 | Charles Townsend Chipperfield ... | Cinque Ports Flying Club | 21.8.39 |
| 19,704 | Maurice Charles Arnold ... ... | Herts and Essex Ae. C. ... | 21.8.39 |
| 19,705 | Richard Paul Todd ... ... | Insurance Flying Club ... | 21.8.39 |
| 19,706 | Frank Preston Price ... ... | Thanet Aero Club ... | 21.8.39 |
| 19,707 | Lola Ralph ... ... ... | Thanet Aero Club ... | 21.8.39 |
| 19,708 | Frederick Alfred Harmer ... | Thanet Aero Club ... | 21.8.39 |
| 19,709 | Edward Frederick Ganly ... | Insurance Flying Club ... | 21.8.39 |
| 19,710 | Joyce Eleanor Newitt ... ... | Isle of Wight F.C. ... | 21.8.39 |
| 19,711 | Horace Hubert Chance ... ... | Midland Aero Club ... | 21.8.39 |
| 19,712 | Henry Theo Testar ... ... | Midland Aero Club ... | 21.8.39 |
| 19,713 | John Laurence Hillel Berlandina... | Redhill Flying Club ... | 21.8.39 |
| 19,714 | James William Clark ... ... | Southend Flying Club ... | 21.8.39 |
| 19,715 | Rowland Ernest Handley ... | Southend Flying Club ... | 21.8.39 |
| 19,716 | Elmer Ellsworth Jones ... ... | Southend Flying Club ... | 21.8.39 |
| 19,717 | Edmund James Purdin ... ... | Southend Flying Club ... | 21.8.39 |
| 19,718 | George Bain ... ... ... | Sheffield Aero Club ... | 21.8.39 |
| 19,719 | Kenyon Charles Francis Belton ... | Lincolnshire Aero Club ... | 21.8.39 |
| 19,720 | Albert William Bennyworth ... | Lincolnshire Aero Club ... | 21.8.39 |
| 19,721 | Kenneth Norman Holyoak ... | Thanet Aero Club ... | 21.8.39 |
| 19,722 | Percy Donald Smith ... ... | Thanet Aero Club ... | 21.8.39 |
| 19,723 | Roy Douglas White ... ... | Plymouth and Dist. Ae. C. | 21.8.39 |
| 19,724 | John Sale Collingwood Maughan... | Thanet Aero Club ... | 21.8.39 |
| 19,725 | Ernest Ronald Peter Shackle Cooper | Cinque Ports Flying Club | 22.8.39 |
| 19,726 | Laurence Hallows Worskett ... | Plymouth and Dist. Ae. C. | 22.8.39 |
| 19,727 | Richard Charles Payne ... ... | Ipswich Aero Club ... | 22.8.39 |
| 19,728 | Alfred Howard Thompson ... | Newcastle Aero Club ... | 22.8.39 |
| 19,729 | Philip Lindley Hanson-Lester ... | Bournemouth Flying Club | 22.8.39 |
| 19,730 | Wilfred Henry Gilbert ... ... | Bournemouth Flying Club | 22.8.39 |
| 19,731 | Charles Henry David Dean ... | Bournemouth Flying Club | 22.8.39 |
| 19,732 | Leslie William Jones ... ... | Southend Flying Club ... | 22.8.39 |
| 19,733 | Douglas Joseph Stradwick ... | Southend Flying Club ... | 22.8.39 |
| 19,734 | James Gordon Priestley ... ... | Wiltshire Flying Club ... | 22.8.39 |
| 19,735 | Kenneth Philip Hubert Cleife ... | York and Leeming F.C.... | 22.8.39 |
| 19,736 | Ronald Fletcher ... ... ... | York and Leeming F.C.... | 22.8.39 |
| 19,737 | Michael Hugh Vivian ... ... | Witney and Oxford Ae. C. | 22.8.39 |
| 19,738 | Laurence Roy Foote ... ... | Ipswich Aero Club ... | 22.8.39 |
| 19,739 | Daniel Sutherland... ... ... | Ipswich Aero Club ... | 22.8.39 |
| 19,740 | Trevor Brooks Colman ... ... | Weston Aero Club ... | 22.8.39 |
| 19,741 | Anthony Tennant Leaning ... | Ipswich Aero Club ... | 22.8.39 |
| 19,742 | Philip Douglas Vernon Hackett... | Reading Aero Club ... | 22.8.39 |
| 19,743 | Edward James Henry Heather ... | Reading Aero Club ... | 22.8.39 |
| 19,744 | John William Delaval Beresford... | Reading Aero Club ... | 22.8.39 |
| 19,745 | Eric Gordon Adams ... ... | Reading Aero Club ... | 22.8.39 |
| 19,746 | Vernon Joseph Huse ... ... | Reading Aero Club ... | 22.8.39 |
| 19,747 | Patrick Charles James Whelan ... | Isle of Wight Flying Club | 22.8.39 |
| 19,748 | Cyril Campbell Login ... ... | London Air Park F.C. ... | 22.8.39 |
| 19,749 | Adrian Benjamin Golay ... ... | London Air Park F.C. ... | 22.8.39 |
| 19,750 | Douglas Charles Fenn ... ... | London Air Park F.C. ... | 22.8.39 |
| 19,751 | David Francis Alastair McBain... | London Air Park F.C. ... | 22.8.39 |
| 19,752 | Eric Gordon Thomas Hanson ... | Romford Flying Club ... | 23.8.39 |
| 19,753 | Clement Bensley Cuming Gardner | South Coast Flying Club... | 23.8.39 |
| 19,754 | Graeme Frederick Wallace ... | South Coast Flying Club... | 23.8.39 |
| 19,755 | David Noel Harper ... ... | Redhill Flying Club ... | 23.8.39 |
| 19,756 | John Basil Robinson ... ... | Redhill Flying Club ... | 23.8.39 |
| 19,757 | Raymond Edward Finch ... | Redhill Flying Club ... | 23.8.39 |
| 19,758 | Edith Joan Wilson ... ... | Redhill Flying Club ... | 23.8.39 |
| 19,759 | John Percival Long ... ... | Hampshire Aeroplane Club | 23.8.39 |
| 19,760 | Mary Masefield Golden ... ... | Hampshire Aeroplane Club | 23.8.39 |
| 19,761 | Charles Henry Frederick Grant... | Exeter Aero Club ... | 23.8.39 |
| 19,762 | Alex Uttley ... ... ... | Redhill Flying Club ... | 23.8.39 |
| 19,763 | Herbert William Robinson ... | Midland Bank Flying Club (Horton Kirby). | 23.8.39 |
| 19,764 | Barry Hamilton Codrington Nation. | No. 20 E. and R.F.T.S., Gravesend. | 23.8.39 |
| 19,765 | Edmund Patrick Osborne Watson | Brooklands Flying Club... | 23.8.39 |
| 19,766 | Thomas Turvey ... ... ... | South Staffs Aero Club... | 23.8.39 |
| 19,767 | Ronald Jack Allen ... ... | Bedford Aero Club ... | 23.8.39 |
| 19,768 | Andrew Davies ... ... ... | Lincolnshire Aero Club ... | 23.8.39 |
| 19,769 | Arthur Owen Price ... ... | Lincolnshire Aero Club ... | 23.8.39 |
| 19,770 | Horace Garth Featonby ... ... | Civil Service Flying Assn. | 23.8.39 |
| 19,771 | Ronald Atkinson ... ... ... | Civil Service Flying Assn. | 23.8.39 |
| 19,772 | Charles Leonard Heyne ... ... | South Staffs Aero Club ... | 23.8.39 |

# SUSPENSION OF EMPIRE AIR MAIL SCHEME

THE Postmaster-General announces that the arrangements whereby all first-class mail has been forwarded by air for Empire destinations served by the England-India-Malaya-Australia and England-South Africa air mail services, and for Egypt and Iraq, have been suspended. Subject to what is stated below, all first-class mail for the countries in question will be forwarded by surface route, the rates of postage being:

For all the Empire destinations in question and Egypt:

Letters: first ounce 1½d.; for each subsequent ounce 1d.; postcards 1d.

For Iraq and Kuwait.—Letters, first ounce 2½d.; for each subsequent ounce 1½d.; postcards 1½d.

Correspondence for any of the countries hitherto served under the Empire Air Mail Scheme can still be forwarded by air mail, if the sender so desires, in which case it must be fully prepaid at the rate of 1s. 3d. per half ounce (postcards 7d.) and a blue air mail label must be affixed at the top left-hand corner of the address side of the envelope.

The latest times of posting air mail correspondence at the Head Post Office, London, E.C.1, will be as follows, with correspondingly earlier times elsewhere:—

England-East Africa, 12 noon Tuesdays.

England-East Africa-South Africa, 12 noon Fridays.

England-India-Malaya-Australia, 12 noon Wednesdays and Saturdays.

Approximate times of transmission cannot be quoted.

The air postage rate to the West African colonies and to certain foreign countries served by the Empire air services for which the rate has hitherto been less than 1s. 3d. per half ounce is increased to 1s. 3d.

### *The Japanese World Flight*

ON August 27 the Japanese twin-engined commercial monoplane *Nippon* left Sapporo, in Northern Japan, for a round-the-world goodwill flight. The machine covered the first oversea leg of 2,500 miles to Nome, Alaska, in 14 hr. 24 min. Two days later the machine reached Fairbanks and then White Horse, Yukon.

The *Nippon* was built by the Mitsubishi Heavy Industry Corporation and has two Mitsubishi 900 h.p. engines. The cruising speed of the type is given as a little over 160 m.p.h. The chief pilot is Sumitoshi Nakao.

The route planned for the machine is via Los Angeles, New York, Miami and Santiago de Chile to Buenos Aires. Thence it was planned to fly to Rio, Natal and across the South Atlantic to Dakar, and to Europe. Presumably the new-world section of the tour will be abandoned.

### *Back to Three Engines?*

LLOYD STEARMAN, who is responsible for the Stearman Hammond monoplane, has designed a new transport type which is interesting not only because it had a tricycle undercarriage but particularly because it shows the tendency to return to the three-engined layout. The idea is to give engine-failure safety without going to the expense of installing four smaller engines. The Trans Air 17 transport can be fitted either with three Wasp Juniors, three Rangers, or three Wright Whirlwinds.

It is an all-metal low-wing monoplane carrying fourteen passengers and the fuselage has a deep tail which fairs into the fin rather after the manner of the old three-motor Couzinet. With three Wasp Juniors the all-up weight is 19,000 lb., the maximum speed is 240 m.p.h., and the cruising speed 195 m.p.h. More important is the initial rate of climb, which is somewhat phenomenally high for the type at 1,660 ft./min.

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# THE LIGHT AEROPLANE of TO-MORROW

## *Present Trends and Future Possibilities in Design and Production : A Suggested "Ideal" Layout*

By J. P. SMITH

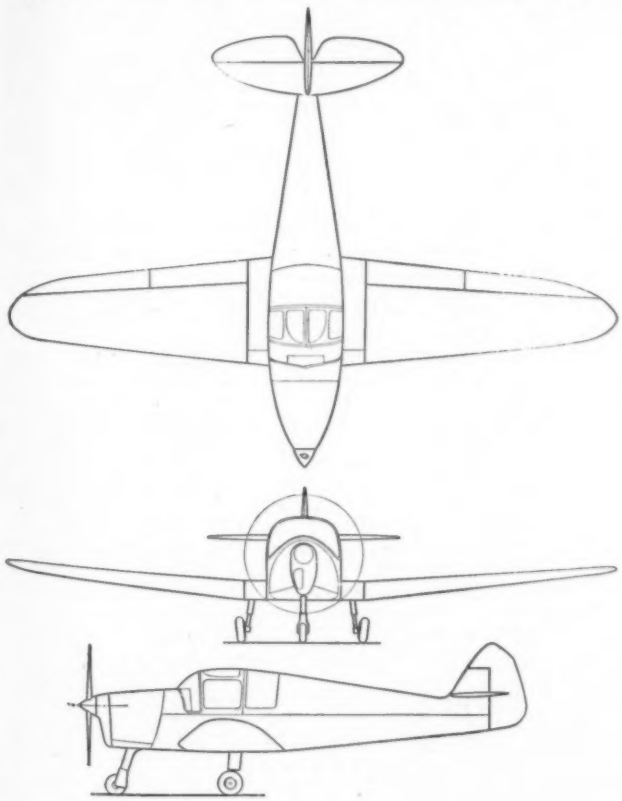
UNCOMFORTABLE though it may be to admit the fact, private ownership in this country has been steadily declining. There was no doubt at all of the importance, both to the country in general and to the aircraft industry in particular, of large-scale ownership, and the question merely resolved itself into one of discovering how such an increase could be encouraged.

The whole subject is somewhat involved, and a study of the prospective market would solve only a part of the problem. The rest is a matter for designers and production engineers. While the present cost and difficulties in maintenance and operation has concerned the simplest types of aeroplane they also tend to deter the person who might otherwise be an owner.

Dealing with the prospective market, this, again, is further subdivided. In the first place there has been the natural desire of the Government that the public should do as much flying as possible. Then there is the undoubted desire of a certain section of the public to own machines. And, finally, there is the question of initial and later costs.

At intervals during the last decade there has been talk of the need for what is so inaptly known as an "air-minded" nation, and more recently this need has come to the fore with the necessity to provide a large reserve of pilots. Obviously, the best way of succeeding in this business of "air-minding" the people is to make us a nation of aircraft owners. At the present time the United States is the only country which appears to have fully grasped this fact, and the Civil Aeronautics Authority, whose duty, among others, is to further the development of private flying, has already acted on it. Probably the later moves in the U.S. have been accelerated by the formation in this country of the Civil Air Guard. But it goes a good deal farther than this scheme, and is likely to produce much more widespread and lasting effects than the offer of a miserable few hours of cheap flying every year.

In fact, the apparent lack of foresight on the part of the instigators of the C.A.G. scheme could only be excused on the grounds that it could be set in motion so much more quickly in its present form, and provided a very large number of partly trained pilots in a shorter time than the American scheme. Through a widened C.A.G. scope a live aircraft industry and a large supply of moderately experienced pilots would have been ensured—and that at negligible cost.



DATA

| | |
|---|---|
| Max. b.h.p. | 60 at 3,000 r.p.m. |
| Gear ratio | 0.66 |
| Span | 32ft. |
| Wing area | 130 sq. ft. |
| Gross weight | 1,300 lb. |
| Tare weight | 775 lb. |
| Pilot | 170 lb. |
| Passenger | 170 lb. |
| Petrol (16 gals., 4.5 hrs.) | 125 lb. |
| Oil | 10 lb. |
| Luggage | 75 lb. |
| Disposable load | 550 lb. |
| Top speed | 117 m.p.h. |
| Stalling speed | 45 m.p.h. |
| Initial rate of climb | 620 ft./min. |
| Take off | 190 yds. |
| Landing run | 100 yds. |
| Cruising speed | 105-110 m.p.h. |
| Ultimate range | 480 miles. |

**This G.A. drawing shows the type of machine the writer has in mind. The controls would, in the first instance, be conventional, with rudder and front wheel connected to the rudder bar and brakes on the rear wheels. Eventually, the front wheel would be connected to the control-wheel operating the ailerons and twin fins and rudders would probably be fitted. The twin rudders might then be interconnected with the ailerons and front wheel or abolished altogether. The engine would be controlled by a foot or hand throttle—the foot throttle for use on the ground, and the hand throttle for take-off and while in the air. The brakes would be controlled by a foot pedal and the flaps by a hand lever. A geared engine would be used with a controllable-pitch airscrew.**

In the meantime the Air Registration Board should be in a good position to assist. Its work in this connection was definitely implied in the Gorell report, on the recommendations of which the Board was originally formed.

The aim is always to safeguard the public, and machines not used for hire and reward need not carry a C of A. In practice, however, machines without a C of A, even when built by a reputable manufacturer, are difficult to sell. Public prejudice and the insurance companies make the project very difficult, while the action of the Air Ministry in banning the flying of non-certificated machines from and to R.A.F. aerodromes has not improved the prospects. Nor is it possible, because of the action of Dominion and foreign governments, to export such machines.

"Flight" photograph.

The Stearman-Hammond, a "rationalistic" type from America, which is now out of production. From this the rudders are fixed and turning control is through the ailerons and elevator.

Assistance can be given, on the design side, by rationalising requirements, and, where possible, by reducing their number. A further improvement might be made by subdividing the present ten-seat-and-under aircraft category, according to gross weight or seating capacity, and reconsidering both load factors and stiffness requirements accordingly. The recent tendency has been to attempt to apply requirements equally to large air liners and to 40 h.p. single-seaters.

This idea of subdividing the categories may, on the face of it, seem to be illogical and so, presumably for this reason, was dropped by the Air Ministry. Remembering the stimulating effect of such subdivision on the American light aircraft manufacturing industry it does, however, appear to be justifiable. In the United States the limiting figures are 1,000 lb. gross weight and 6 lb./sq. ft. wing loading and, as an example of the effect, one manufacturer alone sold 800 machines last year.

## *Aerobatics*

Under American requirements there is no distinction between aerobatic and non-aerobatic aircraft, while all machines up to 4,000 lb. gross weight must recover from a six-turn spin in one and a half turns. The engines and airscrews for use on machines up to the 1,000 lb gross weight limit need not be certified as having passed a type test, but may be given a horse-power rating on completion of a five-hour full-throttle run at the maximum permissible r.p.m.

To sum up, even more progress than that seen in the American light aircraft industry might be made if the Air Registration Board could see fit to draw up similar regulations for machines below a gross weight of approximately 1,300 lb., with a limitation on full-load stalling speed of 45 m.p.h.

As a second-best arrangement, the same line of action might be adopted by the insurance companies and applied also to non-certificated machines.

On the inspection side there is room for considerable improvement, and one hopes that approved firms will be permitted to do business with each other, with the minimum supervision and without the necessity of adhering to a strict routine. Judging from recent experience, this would not result in any lessening of care, but would reduce production delays and consequent irritation.

There is no doubt that the younger generation is becoming more and more interested in flying as a means of recreation, stimulation and transport. The market, therefore, is an ever widening one and the C.A.G. will, as "Indicator" recently remarked in his comments, bear fruit in 1941-43.* By that time there should be a prospective market of 5,000 to 10,000 would-be private owners.

Much has been written on the subject of cost and mass production. It is stated that a cheap aeroplane cannot be produced until a large number are turned out per annum, and that until the aeroplane is cheap the production per annum will be low—all of which leads us nowhere. The responsibility for the cost of present light aeroplanes rests with many individuals, including the design staff, the production staff, the supervising authority and the purchaser.

It seems that every private owner needs different equipment and types of equipment, together with a different colour scheme for his machine, and he does not realise that this considerably increases the factory staff and consequently production overheads. This ultimately raises the cost of all machines, standard or otherwise, as the increased cost cannot be fully assessed; even if this were possible, it could not be fully recovered from the purchaser as the consequent charges would appear foolish. The car manufacturer was not able to reach his present low cost until he could standardise on colour schemes and extras. Any extras are now fitted by the service department, even though it may mean pulling the car to pieces—with its attendant high cost. The increased staff at an aircraft factory is at present kept occupied in seeing that each machine is painted in exactly the correct shade of lavender or other boudoir colour, and in filling up forms in quintuplet when Mr. Purchaser decides he would like a Truecourse instead of an Offcourse compass.

It is sufficient to say here that a very substantial saving in cost can be effected by closer co-operation between the supervising authority, the design staff and the production staff. This statement will be elaborated later.

## *Design*

The aim of the designer must be to develop a machine which has a good reserve in take-off, climb and landing, with a payload of 500-600 lb., so that it may have the widest application, and at the same time it must be cheap to buy and to operate. The necessary speed can be obtained without much difficulty.

The whole question revolves round the engine and the airscrew with the wing taking secondary place. What is the minimum horsepower for the required take-off and climb? With present ungeared engines and fixed-pitch airscrews, it appears to be in the region of 70-90 h.p., and without further development of the engine-airscrew combination, little progress can be made. A great step forward will be made when there is a variable pitch airscrew and a reliable 50-60 h.p. geared engine which can be produced together for £150 at a rate of 200 to 300 a year. The total weight of each unit should not exceed 160 lb. complete.

* This article was, of course, written before Great Britain was at war.—Ed.

The three-cylinder radial engine offers the greatest possibilities from the engine designer's point of view, and its advantages of low weight and cost appear to outweigh the disadvantages of drag and of installation difficulties—at least from the aircraft designer's standpoint.

When such an engine-airscrew combination is available, it will be possible to produce a 60 h.p. aeroplane with almost the performance of to-day's 90 h.p. machine, with a consequent reduction in operating costs. This machine will employ slotted flaps, or more efficient high lift devices, to reduce the take-off run and the stalling speed. It would be fitted with a tricycle undercarriage and would have side-by-side seating. The latter very considerably reduces longitudinal trim difficulties on small machines.

It may be argued that such a machine, being more complicated, would be more costly. The reduced dimensions more than outweigh this consideration. A low-wing monoplane is to be preferred to the high-wing. Production costs are lower and, more important to-day, the pilot's field of vision can be very much better.

One further point which affects first cost and performance very considerably is that of folding or non-folding wings. Folding wings decrease the disposable load 4 to 6 per cent. and may increase the aircraft cost from approximately 3 to 7 per cent., but with the present hangar charges in this country the private owner will quickly recover the extra outlay. However, it is hoped that circumstances will eventually permit non-folding wings to be universally acceptable in this country.

There is a good deal of illogicality in the present requirements for civil aircraft. It appears that there is an unnecessary distinction between aerobatic and non-aerobatic aircraft as regards structural strength. The most severe flying loads may be imposed on a machine flown in cloud by an inexperienced pilot who, finding himself diving inverted or otherwise at the ground, heaves in despair with all his strength on the stick. Aerobatics must be executed very badly indeed to produce similar loads.

## *Load Factors*

Presumably the distinction was made as a result of experience during the last war, but this may be discounted on the grounds that the factors in those days were too low in any case. A C.P. Forward factor of approximately 8 for all aircraft under a certain gross weight would seem more logical. Furthermore, all such small machines should be spun, whether aerobatic or not. In practice, this is usually done by the manufacturer, who values his good name; but if the regulations are intended to serve as a guide as to what is wise and what is foolish, it is reasonable to include this requirement.

The design staff has by far the greatest control over production costs. With production rate at its present figure of about 200-300 machines a year, the airframe must be designed for cheap manufacture in small quantities, and, just as there is cheap mass-production, there is also economical small production—though the technique is very different. The greatest mistake, in my opinion, is made in trying to apply mass-production methods to light aircraft. Not even the shadow factories are producing at real mass-production rates. The greatest use must be made of sound commercial products which are already available, and many of the advantages of low cost and quick delivery are lost if these components are hedged around with specifications.

For cheap production simplicity must really be the keynote of the design over and above the necessity for low weight in individual parts. It is extraordinary how much weight is saved by simplification in the early stages of the design, and, if good and simple detail design is added to this, more weight will be saved than by the use of very clever but complicated construction.

## *Plastics*

While dealing with production, the subject of materials, and of plastics in particular, is important. The application of plastics will probably be a gradual development. New production methods must first be devised and tried out, since the cost of steel dies and large presses is prohibitive, while for small aircraft materials of lower specific gravity, such as wood, are a great asset in enabling simpler and more robust structures to be designed. While in America manufacturers seem to be turning to all-metal stressed-skin construction even for the smallest machines, this development seems illogical and may be dictated only by fashion.

The subject of operating costs is very wide. That of hangarage has been mentioned in relation to folding and non-folding wings—needless to say, a reduction in charges should be aimed at. The annual C. of A. is a necessary evil from the running cost point of view, while the cost of spares and servicing are the pet bar subjects of downtrodden private owners. Service managers and aerodrome owners will serve their interests best when they try to help the poor rather than to rook the rich.

There will eventually be an enormous field for development in every branch of private flying, and I feel that this development will be slow until one of the large aircraft concerns concentrates a portion of its energies on this private owner market. Everybody concerned—designers, controlling authorities, production engineers and service managers—should do more flying to gain a better understanding of the needs of the private owner, and sales departments should consider the family man with a limited income. After this war is over, let us all aim at developing private flying to its fullest extent.

Another rational aeroplane, the Engineering and Research Corporation's model 310. It has been designed by Mr. F. E. Weick, who was previously responsible for a special type made to the order of the old U.S. Bureau of Air Commerce. Though fairly conventional in appearance, apart from the tricycle undercarriage, the ailerons and rudder controls are interconnected.

# TO-DAY'S LIGHT AEROPLANES

## *British Training and Private Owner Types : Good Range in Field of Endeavour which in Peace-time had been Slightly Depressed*

*(Illustrated Mainly by "Flight" Photographs and Drawings)*

THE light aeroplanes described and illustrated in the following pages were designed originally with the needs of the private owner in mind. The fact that we are now at war will cause some of these types to disappear from the market, temporarily at least, but it is very much to be hoped that some of the more promising will be revived when, once more, designers and manufacturers are in a position to devote their energies to civil flying. A considerable proportion of the machines described are of the trainer type and will do useful work in initiating the large number of *ab initio* pilots that will be needed in the immediate future.

An interesting point about the three-view general arrangement drawings published on pp. *b* and *c* is that they are all reproduced to a uniform scale so that their relative size is well, and somewhat surprisingly, illustrated.

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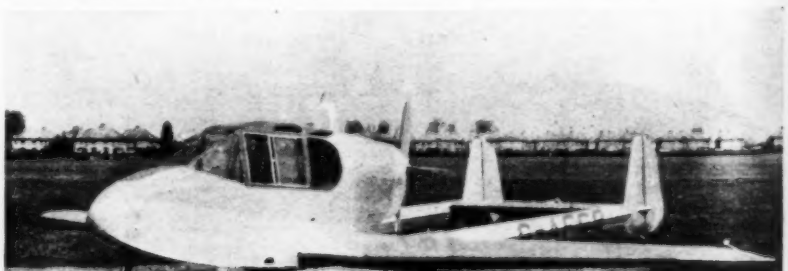
## ARPIN

ONE of the first of the "rational" aeroplanes, the Arpin, is a tandem-seater cantilever low-wing pusher monoplane. In experimental form this tricycle type was fitted with a Salmson engine; the present Mark II version has a Cirrus Minor engine, of 90 h.p., driving a four-bladed pusher propeller. The Arpin is normally flown from the front seat, and is of all wood construction, with a ply-covered wing and boom supported tail unit.

| | |
|---|---|
| *Span* | 31*ft.* 6*in.* |
| *Length* | 23*ft.* 5*in.* |
| *All-up weight* | 1,500 *lb.* |
| *Max. speed* | 112 *m.p.h.* |
| *Cruising speed* (2,300 *r.p.m.*) | 101 *m.p.h.* |
| *Landing speed* (*flaps down*) | 44 *m.p.h.* |
| *Initial rate of climb* | 680 *ft./min.* |

*Makers:* *Arpin Manufacturing Co., Ltd., 8 and 9, Long Acre, London, W.C.2.*



**The Arpin tricycle pusher in its latest form with a Cirrus Minor engine.**

## AUTOGIRO

AT the moment the C40 Autogiro is not available to the public and, as the type is of special interest to the Air Ministry and Admiralty, no figures can be given. The C.40 is the production version of the experimental "jump start" models, and carries two people, side by side, in a semi-enclosed cabin. The machine both leaves the ground and lands without forward run, but, in the air, behaves like and is controlled in the same manner as the older C.30 type, with direct control.

*Makers : The Cierva Autogiro Co., Ltd., London Air Park, Feltham, Mddx.*

**Demonstrating the new C.40 Autogiro from suitably impossible country. In this photograph the machine has just left the ground from a point beside that where the spectator is standing.**

## CHILTON

ORIGINALLY sold with a modified Ford engine, the lively and manœuvrable Chilton single-seater monoplane can now be obtained with an inverted four-cylinder Train engine, which naturally improves the performance very considerably. It is a low-wing cantilever monoplane of all-wood construction and is fitted with large-area split trailing edge flaps. The figures below are for the Train-engined version. A version was shortly to have been fitted with a Continental flat-four of 50 h.p.—an interesting combination.

| | |
|---|---|
| *Span* | 24*ft.* |
| *Length* | 18*ft.* |
| *Weight empty* | 380 *lb.* |
| *All-up weight* | 650 *lb.* |
| *Max. speed* | 135 *m.p.h.* |
| *Cruising speed* | 115 *m.p.h.* |
| *Landing speed* | 35 *m.p.h.* |
| *Initial rate of climb* | 1,000 *ft./min.* |
| *Standard range* | 400 *miles.* |
| *Price* | £375 |

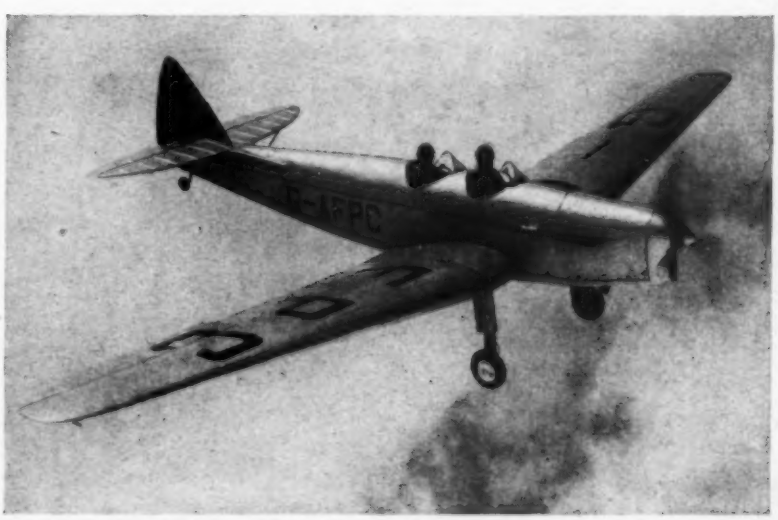
**With the 44 h.p. Train engine the little Chilton single-seater is even tidier than the Ford-engined prototype.**

Work has been in progress on the building of a two-seater Chilton. This is a side-by-side seater cabin monoplane to be fitted with a Walter Mikron engine or other unit of similar power and weight. The designers have concentrated on providing ample room for the two occupants, with especially good all-round visibility. No figures are yet available.

*Makers : Chilton Aircraft, Hungerford, Berks.*

## DE HAVILLAND

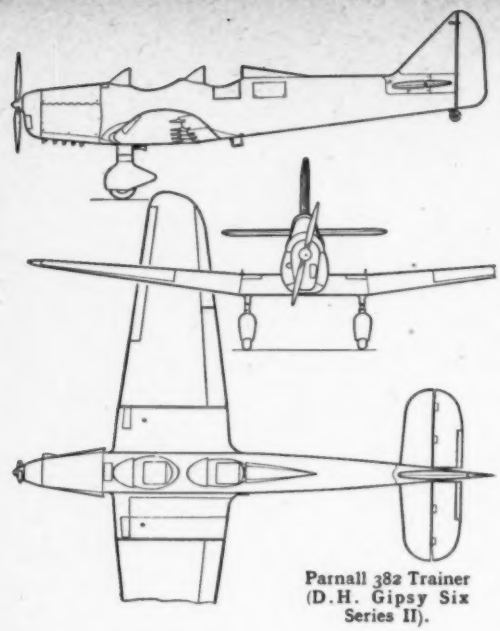
THE Moth Minor, which is now in full production, may be described as the logical successor to the D.H. Moth. It is an all-wood cantilever low-wing monoplane, fitted with the new Gipsy Minor engine of 90 h.p. The two occupants are seated in tandem, with the pilot in the front seat. The Minor is stressed for aerobatics and is intended as an inexpensive type for training and touring. In due course a cabin version will be ready for production.



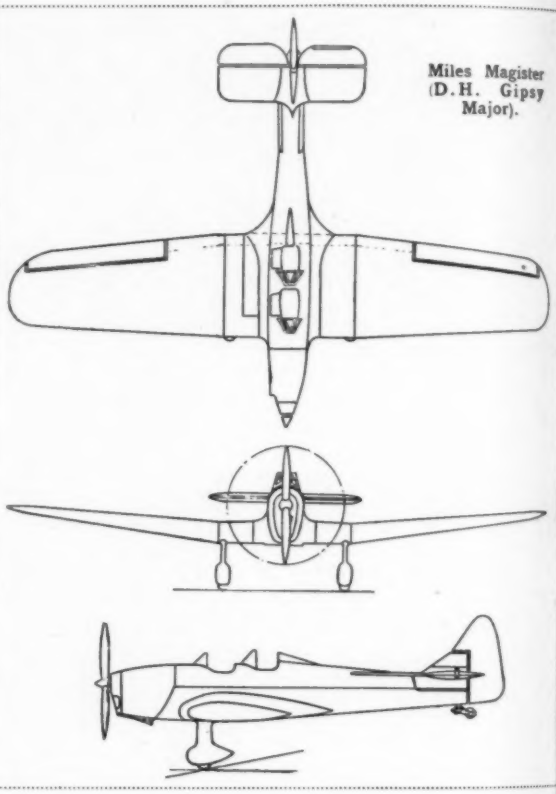
**Moth Successor : The new D.H. Moth Minor, which is an inexpensive machine for touring and training. It is normally flown from the front seat.**

# SHAPES

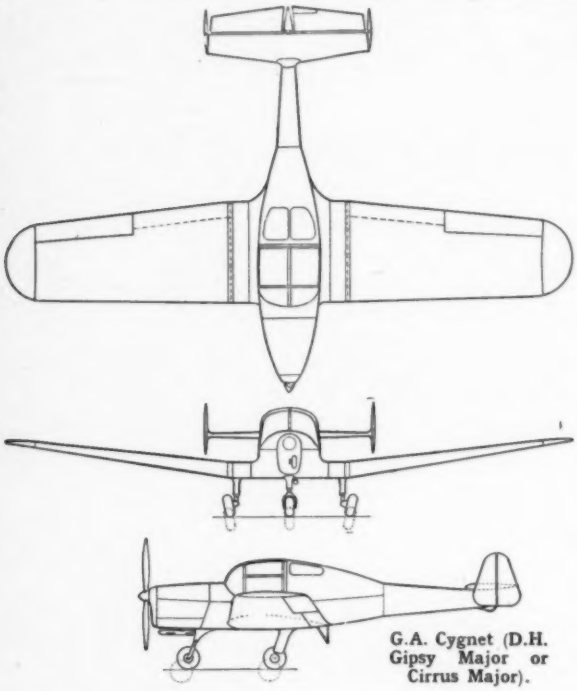
THESE general arrangement drawings of ten of best-known trainer and touring types are all re duced to the scale shown below on the right. comparison provided is interesting, and in some



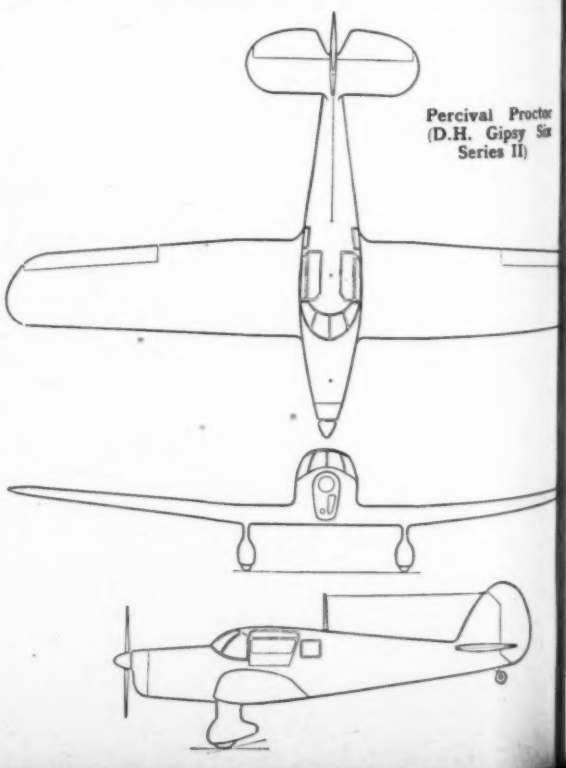
Parnall 382 Trainer (D.H. Gipsy Six Series II).



Miles Magister (D.H. Gipsy Major).



G.A. Cygnet (D.H. Gipsy Major or Cirrus Major).

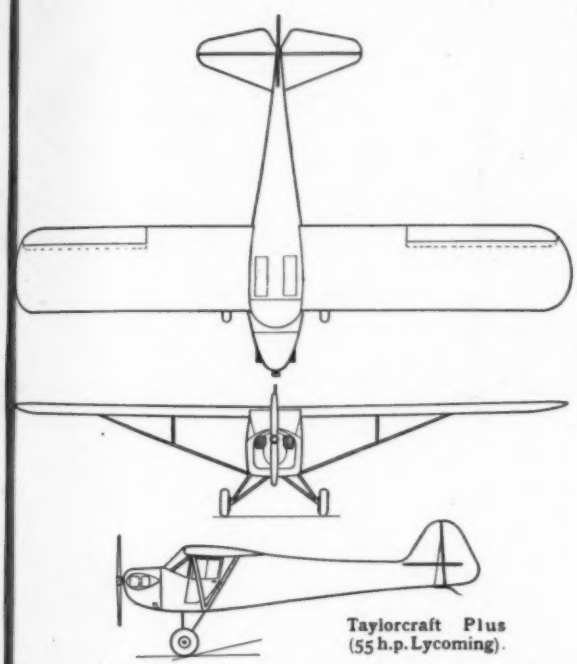


Percival Proctor (D.H. Gipsy Six Series II)

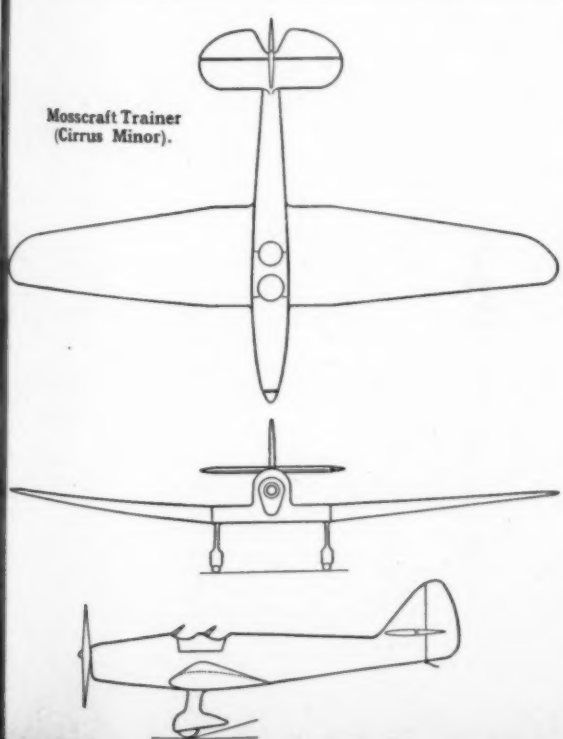
Luton Major (Walter Mikron).

# ES d SIZES

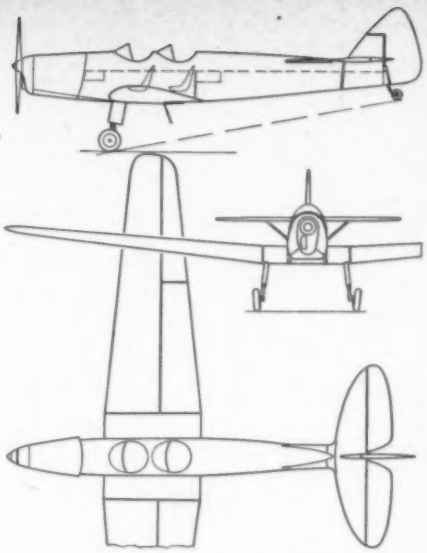
s of ten of prising, in the matter of relative size and span. Such
s are all re tures as plan-form and tailplane position are worth
he right. dy. Three other drawings, of machines not yet in
in some c oduction, will be found on a later page.



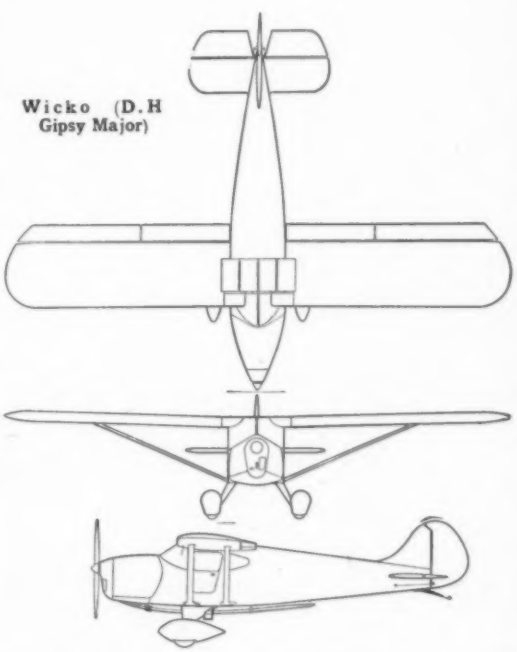
Taylorcraft Plus (55 h.p. Lycoming).



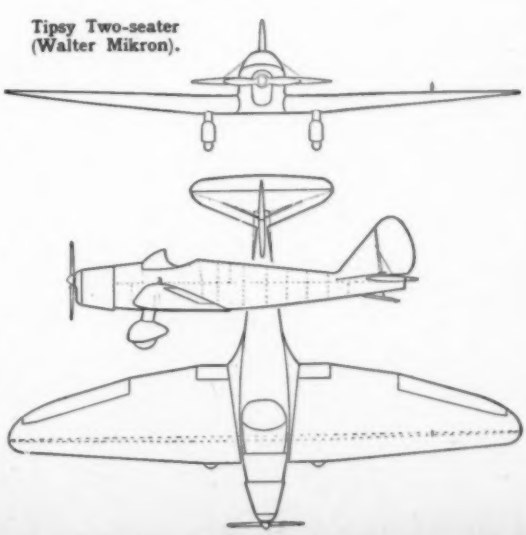
Mosscraft Trainer (Cirrus Minor).



D.H. Moth Minor (D H. Gipsy Minor).

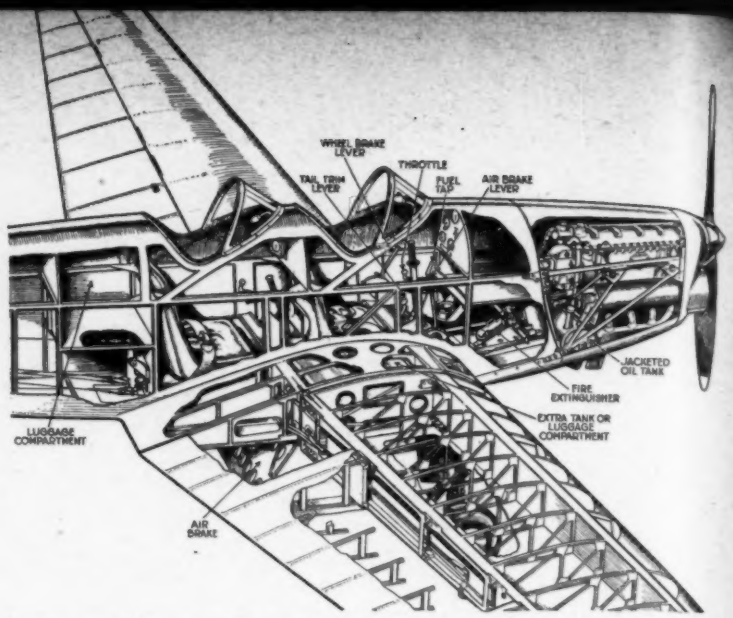


Wicko (D.H Gipsy Major)



Tipsy Two-seater (Walter Mikron).

| | |
|---|---|
| *Span* | 36*ft.* 7*in.* |
| *Length* | 24*ft.* 5*in.* |
| *Weight empty* | 970 *lb.* |
| *All-up weight* | 1,550 *lb.* |
| *Max. speed* | 118 *m.p.h.* |
| *Cruising speed* | 100 *m.p.h.* |
| *Initial rate of climb* | 620 *ft./min.* |
| *Range (two tanks)* | 600 *miles.* |
| *Price* | £575. |




**How the accommodation is laid out in the Moth Minor. This drawing also shows the centre section, wing structure and folding arrangements.**

Needless to say, the Tiger Moth, which is essentially an *ab initio* and aerobatic trainer, is still in quantity production. It is a staggered biplane with tandem seating, and is normally sold with full blind-flying dual equipment. Floats or skis may be fitted in place of a land plane undercarriage for specialised operations.

| | |
|---|---|
| *Span* | 29*ft.* 4*in.* |
| *Length* | 24*ft.* |
| *Weight empty* | 1,115 *lb.* |
| *All-up weight* | 1,770 *lb.* |
| *Max. speed* | 109 *m.p.h.* |
| *Cruising speed* | 93 *m.p.h.* |
| *Landing speed* | 45 *m.p.h.* |
| *Initial rate of climb* | 673 *ft./min.* |
| *Cruising range* | 290 *miles.* |

*Makers: The De Havilland Aircraft Co., Ltd., Hatfield Aerodrome, Herts.*

**The well-known D.H. Tiger Moth is still one of the most popular and largely used primary trainers.**

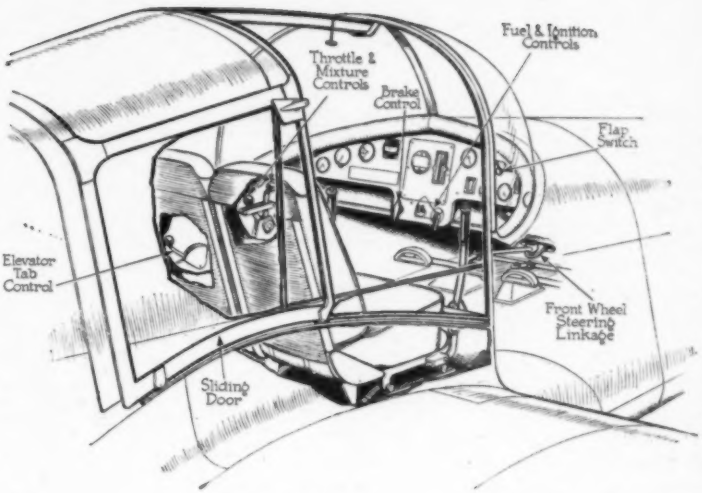
## GENERAL AIRCRAFT

INTERESTING, particularly because it has a tricycle undercarriage, and also because it is of all-metal stressed-skin construction, the General Aircraft Cygnet is now in production as a trainer or tourer. The designer's idea has been to produce a machine which will be virtually trouble-proof, both when flying and on the ground. The Cygnet is a low-wing side-by-side seater cabin machine with twin rudders. It is fully aerobatic and can be fitted either with a Gipsy Major or Cirrus Major engine. The figures given are for the latter.

| | |
|---|---|
| *Span* | 34*ft.* 6*in.* |
| *Length* | 23*ft.* 3*in.* |
| *Weight empty* | 1,475 *lb.* |
| *All-up weight* | 2,200 *lb.* |
| *Maximum speed* | 135 *m.p.h.* |
| *Cruising speed* | 115 *m.p.h.* |
| *Landing range* | 60-85 *m.p.h.* |
| *Stalling speed* | 45 *m.p.h.* |
| *Initial rate of climb* | 800 *ft./min.* |
| *Range* | 445 *miles.* |
| *Price* | £1,250. |

*Makers: General Aircraft, Ltd., London Air Park, Feltham, Mddx.*

**The G.A. Cygnet in its production form. Notice the way in which the roof-"half" slides back.**




**The cabin arrangements of the production Cygnet, the figures for which are given on the previous page, showing the dashboard and control layout and the sliding door system.**

## HILLSON

THE new Hillson Helvellyn trainer should now be ready for its first test flights. It is an open tandem two-seater cantilever monoplane of middle-wing design, with split flaps extending to the limits of the centre section. The engine is a 90 h.p. Cirrus Minor. The designer has attempted to produce a somewhat unorthodox machine which will be the best compromise for *ab initio* training work. It is designed to take a tricycle undercarriage as and when necessary, though the prototype has the normal type. The performance figures below are, of course, estimated:—

| | | | |
|---|---|---|---|
| *Span* | 33*ft.* | *Initial rate of climb* | 750 *ft./min.* |
| *Length* | 22*ft.* | *Range* | 550 *miles.* |
| *Weight empty* | 900 *lb.* | | |
| *All-up weight* | 1,500 *lb.* | | |
| *Cruising speed* (2,300 *r.p.m.*) | 110 *m.p.h.* | | |

*Makers: F. Hills and Sons, Ltd., Trafford Park Road, Manchester, 17.*

## LUTON

FOLLOWING the Luton Buzzard and Minor, Luton Aircraft's latest type is the Major, which is a conventional tandem-seater cabin monoplane of mixed construction, designed for training or touring. The fabric-covered wing is strut-braced and the machine is flown from the front seat either as a partially open or closed machine. A Sports Major, with a slightly reduced span, is in process of development. The engine is a Walter Mikron.

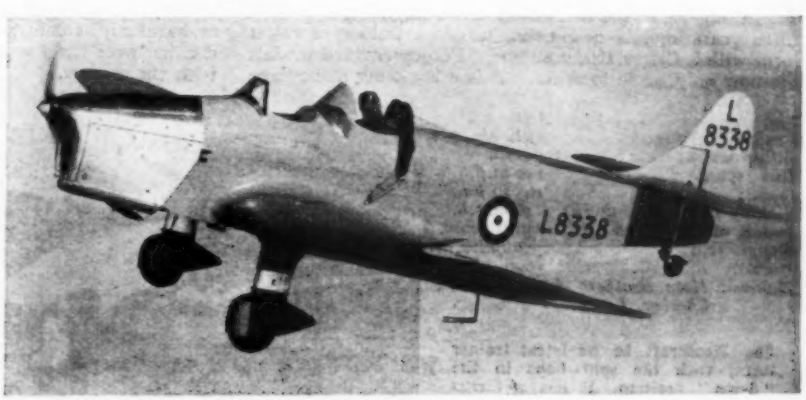
| | |
|---|---|
| *Span* | 35*ft.* 2*in.* |
| *Length* | 23*ft.* 9*in.* |
| *Weight empty* | 600 *lb.* |
| *All-up weight* | 1,030 *lb.* |
| *Max. speed* | 100 *m.p.h.* |
| *Cruising speed* | 90 *m.p.h.* |
| *Initial rate of climb* | 600 *ft./min.* |
| *Range* | 320 *miles.* |
| *Price* | £525. |

*Makers: Luton Aircraft, Ltd., Phœnix Works, Gerrards Cross, Bucks.*

**Normally flown from the front, the Luton Major has a tandem-seater cabin.**

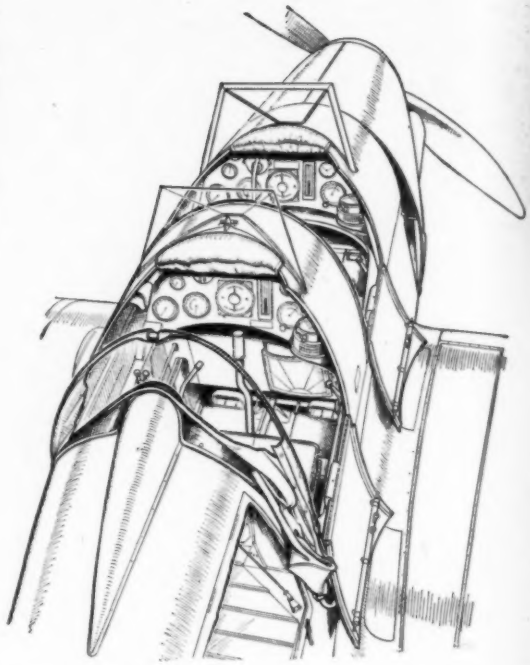
## MILES

AS far as lighter types are concerned, Phillips & Powis have concentrated during the past few months on the manufacture of the Miles Magister, which is a general-purpose trainer in the modern style. The cabin Monarch is no longer in production. The Magister is an




**Although not often seen at clubs, the Miles Magister is one of the standard R.A.F. training types and particularly suited for primary work before passing on to modern types.**

The cockpits of the Magister as they are fitted out for full training requirements.



all-wood low-wing cantilever monoplane with split flaps. Though now very much improved on it from the training-value point of view, the Magister may be considered as a development of the Hawk Major, which set a new standard in its class.

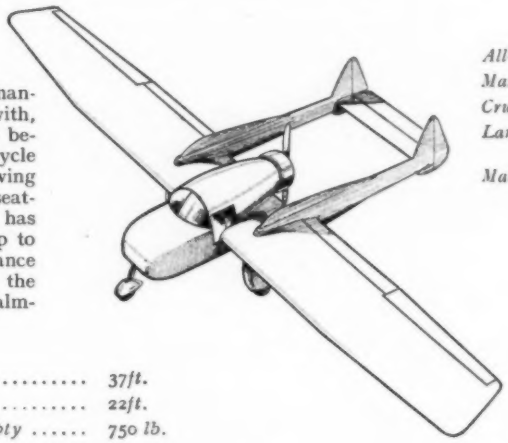
The Magister is of all-wood construction with ply-covered wing and fuselage. It will be remembered that Mr. Miles popularised the low wing type in the lighter class and was one of the first to fit flaps to machines in this class. The Magister is extensively used at elementary training schools.

| | |
|---|---|
| *Span* | 33*ft.* 10*in.* |
| *Length* | 25*ft.* 3*in.* |
| *Weight empty* | 1,240 *lb.* |
| *All-up weight* | 1,825 *lb.* |
| *Max. speed* | 145 *m.p.h.* |
| *Cruising speed* | 125 *m.p.h.* |
| *Landing speed* | 45 *m.p.h.* |
| *Initial rate of climb* | 1,200 *ft./min.* |
| *Range* | 400 *miles.* |

*Makers: Phillips and Powis, Ltd., Reading Aerodrome, Woodley, Berks.*

## MILLICHAMP

ALTHOUGH not at present, for financial reasons, being proceeded with, the Millichamp is of interest if only because it is a pusher type with a tricycle undercarriage. It will be a mid-wing monoplane with side-by-side cabin seating. Incidentally, Mr. Millichamp has designed an entirely new type of flap to suit "level landings." The performance figures are those estimated for the machine when fitted with a 70 h.p. Salmson AD.9.R. radial



| | |
|---|---|
| *Span* | 37*ft.* |
| *Length* | 22*ft.* |
| *Weight empty* | 750 *lb.* |
| *All-up weight* | 1,250 *lb.* |
| *Max. speed* | 110 *m.p.h.* |
| *Cruising speed* | 100 *m.p.h.* |
| *Landing speed* | 35 *m.p.h.* |

*Maker: B. W. Millichamp, 153, Beccles Road, Gorleston-on-Sea, Great Yarmouth.*

The Millichamp pusher monoplane, with a tricycle undercarriage, as it will appear when completed. The prototype will be fitted with a 70 h.p. Salmson AD.9.R. engine.

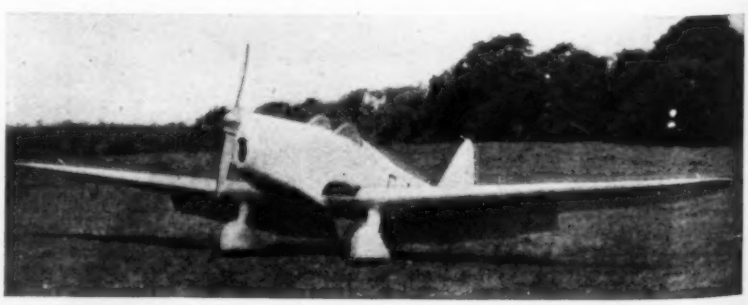
## MOSSCRAFT

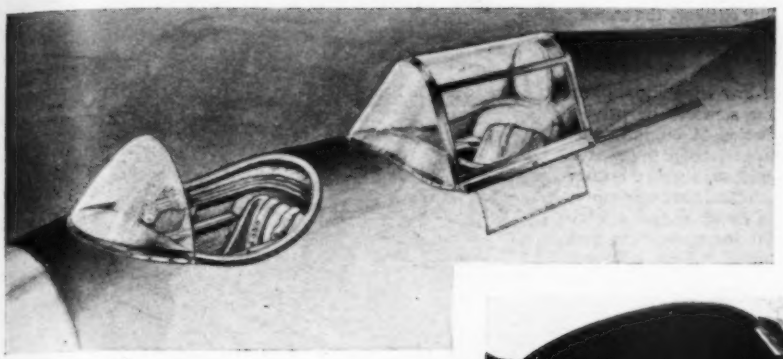
FIRST of the machines to have a "front drive" seating arrangement, the Mosscraft, which originally appeared three years ago, is now being made in trainer or cabin form with a Cirrus Minor engine. Pobjoy-engined models are now only made to order. It is a low-wing monoplane of straightforward construction with split flaps and tandem seating, built by a firm of which five brothers, all pilots, are the directors. An interesting little point of the trainer is that, in order to offer easy entrance with close fitting, and consequently comfortable, cockpit openings, the entire decking over the two separate seats hinges over sideways with the screens.

| | |
|---|---|
| *Span* | 34*ft.* |
| *Length* | 23*ft.* 3*in.* |
| *All-up weight* | 1,400 *lb.* |
| *Max speed* | 120 *m.p.h.* |
| *Cruising speed* | 105 *m.p.h.* |
| *Stalling speed (flaps down)* | 36 *m.p.h.* |
| *Initial rate of climb* | 850 *ft./min.* |
| *Range* | 350 *miles.* |
| *Price* | £690. |

*Makers: Moss Brothers Aircraft, Ltd., Chorley, Lancs.*

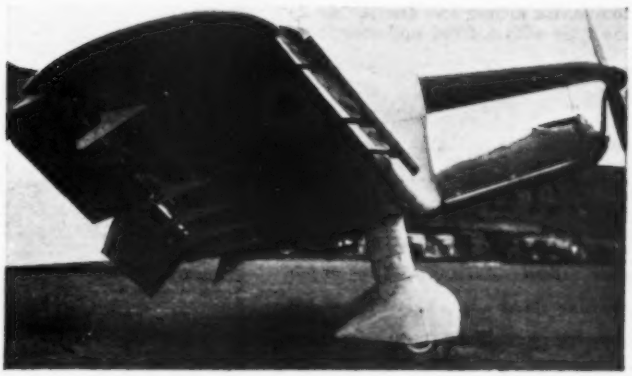
The Mosscraft in its latest trainer form, with the split flaps in the "down" position. It has a Cirrus Minor engine.





On the left is an alternative arrangement for the Parnall 382 cockpits, with that at the rear covered in a similar way to the usual fighter arrangement. In this case it is for the instructor, while the pupil's blind-flying hood is neatly folded inside the front cockpit.

(Below) The slots, flaps and ailerons of the new Parnall trainer. Both flaps and ailerons are slotted.



## PARNALL

THE new Parnall 382 is an elementary and special purpose trainer of slightly higher power than is usual and is fitted, interestingly enough, with H.P. slotted flaps and leading edge slots. It is of all-wood construction, with ply covering for the wings and fuselage, and it can be obtained with open cockpits, with a sliding hood or with variations to suit training needs. The use of a Gipsy Six Series II engine allows the machine to be used for specialised training purposes, while the slots and flaps give it very good stalling characteristics—though the spin and recovery are normal. It can be flown solo from either seat without ballast.

| | |
|---|---|
| *Span* | 33*ft.* 8*in.* |
| *Length* | 28*ft.* 9½*in.* |
| *Weight empty* | 1,655 *lb.* |
| *All-up weight* | 2,450 *lb.* |
| *Max. speed* | 155 *m.p.h.* |
| *Landing speed* | 43 *m.p.h.* |
| *Take-off run (full load in 5 m.p.h. wind)* | 180 *yards.* |

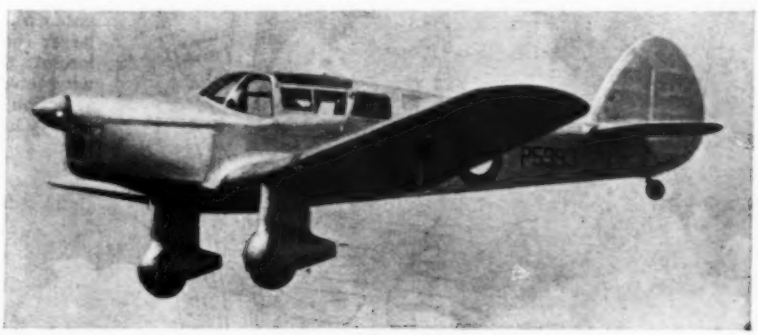
*Makers : Parnall Aircraft, Ltd., Yate Aerodrome, Nr. Bristol.*

(Left) The prototype 382 in the air. Notice that it is being flown solo from the front seat.

## PERCIVAL

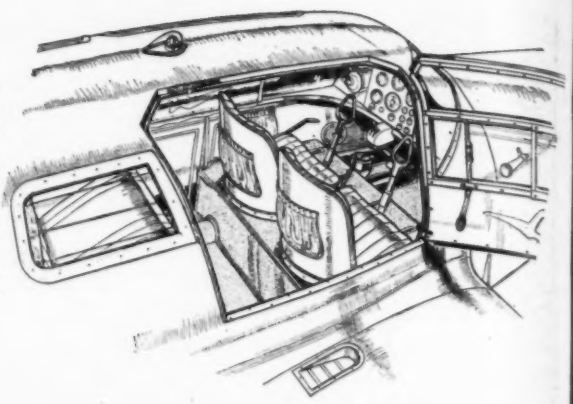
BEST known among the Percival types is the Vega Gull. This is a four-seater low-wing cabin monoplane with a Gipsy Six engine. More recently, a Service type, known as the Proctor, has been developed from the Vega. The Proctor is a three-seater designed for deck-landing, wireless and navigational training, and for communication work. In general layout it is similar to the well-known Vega Gull, but has, as standard, a Series II engine.

| | |
|---|---|
| *Span* | 39*ft.* 6*in.* |
| *Length* | 25*ft.* 10*in.* |
| *Weight empty* | 1,875 *lb.* |
| *All-up weight* | 3,250 *lb.* |
| *Max speed* | 180 *m.p.h.* |
| *Cruising speed (7,000ft.)* | 172 *m.p.h.* |
| *Range* | 600 *miles.* |



The new Percival Proctor, which is intended both for training and communication work. It is a development of the Vega Gull.

(Right) **A normal layout of the Vega Gull showing the ample door width and seating arrangement.**



The Percival Q.6 is a twin-engined low-wing monoplane designed for fast feeder work, charter services or private ownership. It has two Gipsy Six Series II engines with v.p. airscrews, and is normally equipped as a 6-7-seater, though for training or ownership, of course, smaller accommodation would be arranged. The standard equipment includes a free-gyro panel, navigation lighting and electric starters, while the machine is bonded for radio. In fact, it is exceptionally well equipped in normal form. Several Q.6s have been used by private owners and others, of course, for airline and charter work. These figures are for the type with a fixed undercarriage.

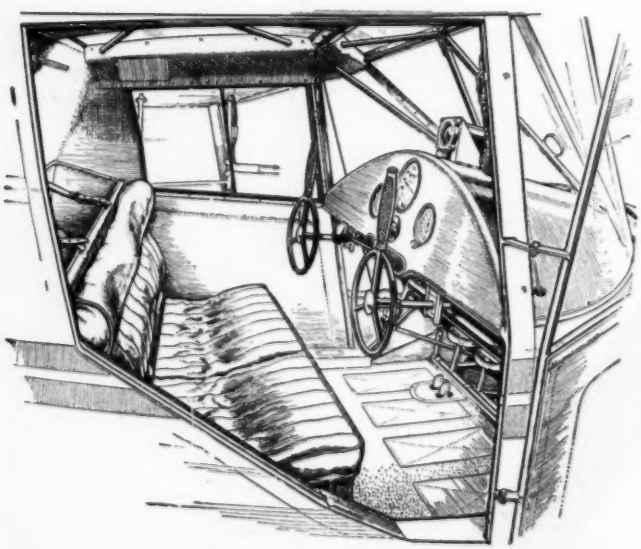
| | |
|---|---|
| *Span* | 46*ft.* 8*in.* |
| *Length* | 32*ft.* 3*in.* |
| *Weight empty* | 3,600 *lb.* |
| *All-up weight* | 5,600 *lb.* |
| *Max. speed* | 195 *m.p.h.* |
| *Cruising speed* | 172 *m.p.h.* |
| *Landing speed (flaps down)* | 58 *m.p.h.* |
| *Initial rate of climb* | 1,150 *ft./min.* |
| *Range* | 700 *miles.* |

**The Percival Q.6 in retractable undercarriage form. This particular machine was one for Australia.**

Although essentially a racing and sporting type, the Percival Mew Gull can also be used for fast mail carrying or fighter-training work. Even with a range of 860 miles the payload, in addition to the pilot, is 483 lb. The Mew Gull is a low-wing cabin single-seater with a Series II Gipsy Six engine and v.p. airscrew. The figures below are for the type E.2H, which is the standard, as opposed to the racing version.

| | |
|---|---|
| *Span* | 24*ft.* 9*in.* |
| *Length* | 20*ft.* 3*in.* |
| *Weight empty* | 1,150 *lb.* |
| *All-up weight* | 2,125 *lb.* |
| *Max. speed* | 235 *m.p.h.* |
| *Cruising speed* (7,000*ft.*) | 220 *m.p.h.* |
| *Initial rate of climb* | 1,700 *ft./min.* |
| *Range* (*standard*) | 860 *miles.* |

*Makers: Percival Aircraft, Ltd., Luton Airport, Beds.*

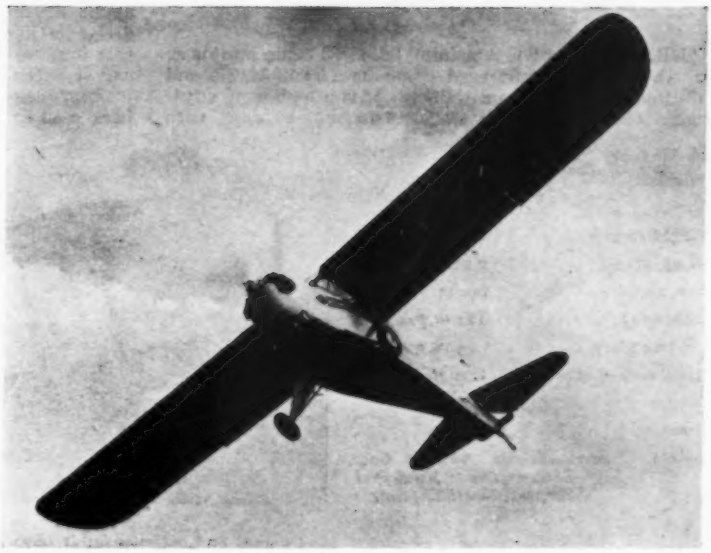


## TAYLORCRAFT

A RE-STRESSED Anglicised version of the Taylorcraft, which is made entirely, except for the engine, in this country, is now available in two versions. One is a standard type for training and the other is a de luxe model for the private owner, with two doors, improved upholstery, larger tyres and other detail changes. The Taylorcraft thus is a side-by-side seater cabin high-wing strut-braced monoplane of all-metal construction, except for the wing spars. The engine is a 55 h.p. Lycoming flat-four.

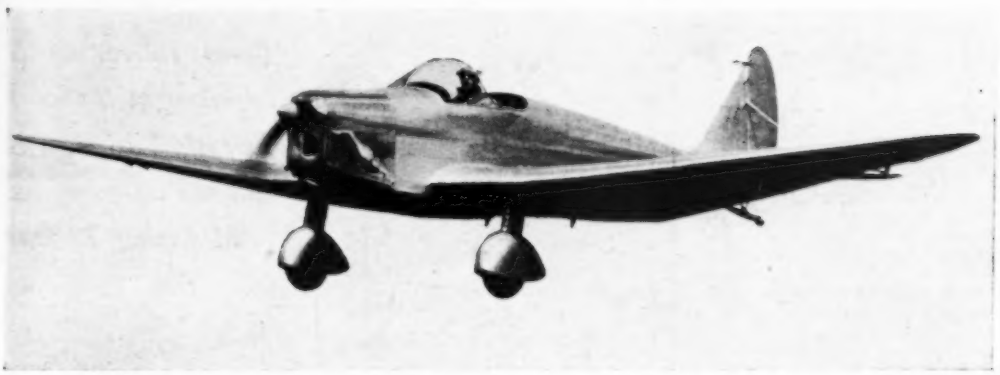
**Inside the Taylorcraft Plus, showing the wheel-cum-stick controls, with the plunger-type throttle in the centre. The simplicity is noteworthy.**

The simple and conventional lines of the Taylorcraft are obvious in this flying view. The separate trimming surface may just be seen below the elevators.



| | |
|---|---|
| *Span* | 36*ft.* |
| *Length* | 22*ft.* |
| *Weight empty* | 700 *lb.* |
| *All-up weight* | 1,200 *lb.* |
| *Max. speed* | 110 *m.p.h.* |
| *Cruising speed* | 90 *m.p.h.* |
| *Landing speed* | 36 *m.p.h.* |
| *Initial rate of climb* | 450*ft./min.* |
| *Safe cruising range* | 275 *miles.* |
| *Price* | £500. |

*Makers: Taylorcraft Aeroplanes (England), Ltd., Britannia Works, Thurmaston, Leicester.*



The Tipsy two-seater has its own distinctive lines which are obvious even in this three-quarter frontal view.

## TIPSY

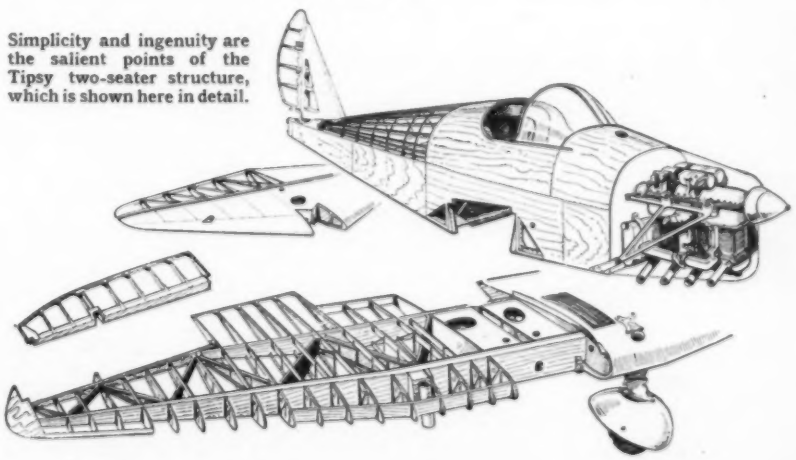
A SIDE-BY-SIDE seater low-wing monoplane, the Tipsy is intended for *ab initio* training and private ownership. In its latest form it has fixed "letter-box" slots near the wing-tip; these do not affect, but provide aileron control at, the stall.

As it originally appeared, the Tipsy was designed by Mr. Tips, of the Belgian Fairey Company, but it has since been considerably modified for production though the design work continued to be supervised by the Fairey Company over here. It has small, camber-changing flaps which steepen the glide without seriously altering the lift characteristics.

| | |
|---|---|
| *Span* | 31*ft.* 2*in.* |
| *Length* | 22*ft.* |
| *Weight empty* | 624 *lb.* |
| *All-up weight (max.)* | 1,200 *lb.* |
| *Max. speed* | 110 *m.p.h.* |
| *Cruising speed* | 100 *m.p.h.* |
| *Stalling speed* | 35 *m.p.h.* |
| *Initial rate of climb* | 500*ft./min.* |
| *Range* | 500 *miles.* |
| *Price* | £550. |

*Makers: Tipsy Aircraft Co., Ltd., London Air Park, Feltham, Mddx.*

Simplicity and ingenuity are the salient points of the Tipsy two-seater structure, which is shown here in detail.



## WICKO

ONE of the very few remaining full-sized cabin machines, the Wicko can be used either as a comfortable and safe touring type or as a trainer. It is a high-wing strut-braced cabin monoplane seating two side by side, with ample luggage accommodation. Generally speaking, the design is conventional, with the solid virtues which this fact implies, but it has large area camber-changing flaps and a special type of fuselage construction to simplify maintenance. In the 1939 model special attention has been paid to the provision of an adequate all-round view.

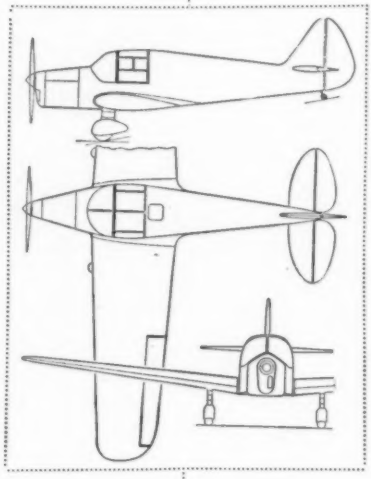
| | |
|---|---|
| *Span* | 31*ft.* 6*in.* |
| *Length* | 23*ft.* 6*in.* |
| *Weight empty* | 1,255*lb.* |
| *All-up weight* | 2,000*lb.* |
| *Max. speed* | 140 *m.p.h.* |
| *Cruising speed* | 122 *m.p.h.* |
| *Landing speed* | 45 *m.p.h.* |
| *Initial rate of climb* | 800 *ft./min* |
| *Range* | 480 *miles.* |
| *Price* | £995 |

*Makers: Foster Wikner Aircraft Co., Ltd., The Municipal Airport, Southampton.*

**Internal and external finish have been given special attention in the new Wicko, which is a side-by-side two-seater cabin monoplane.**

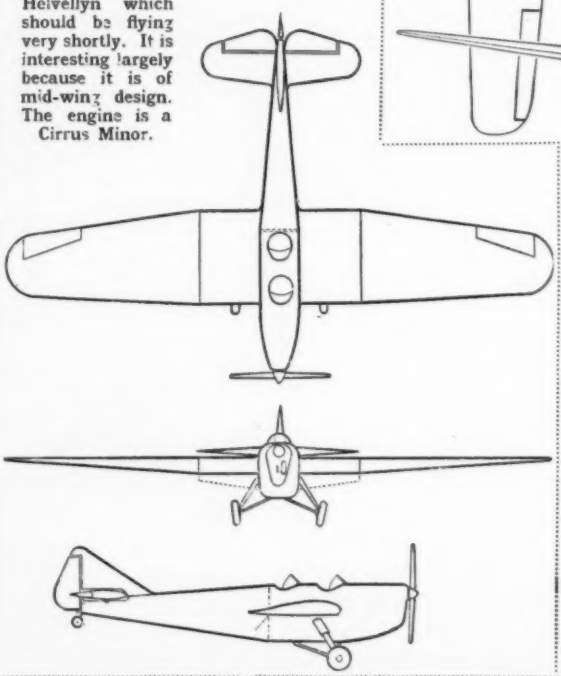
# ON AND OFF THE DRAWING BOARD

*Three Interesting New Lightweight Types : A Tricycle Pusher, a New Cabin Two-seater and a Mid-wing Trainer*

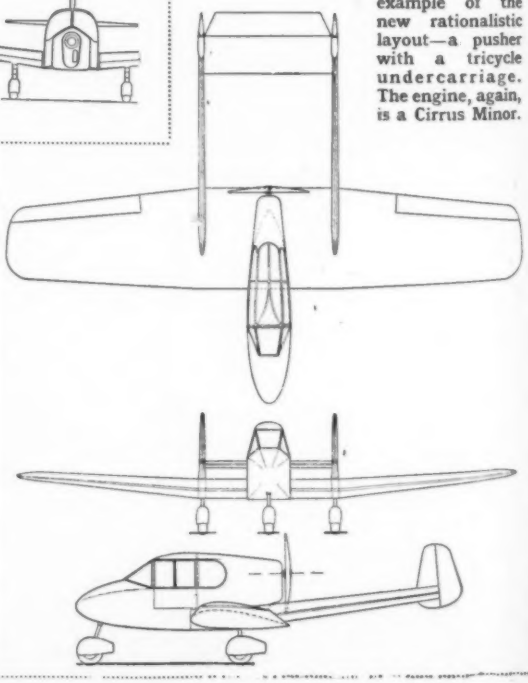


**On the right is the two-seater Chilton monoplane, in which view, forward, downward and upward, has been specially considered. The engine will probably be a Walter Mikron.**

**The Hillson Helvellyn which should be flying very shortly. It is interesting largely because it is of mid-wing design. The engine is a Cirrus Minor.**



**The Arpin, an example of the new rationalistic layout—a pusher with a tricycle undercarriage. The engine, again, is a Cirrus Minor.**



# FOREIGN MACHINES on the BRITISH MARKET

*Some American Trainers and Tourers for Which Agencies are Held*

With 65 h.p., the latest Chief has a useful performance as a floatplane. This one, owned by Mr. H. B. Chapman, was actually the first to be produced.

## AERONCA

AMONG American lightweights the most noticeable trend is in horse-power increase. The Aeronca, for instance, is now available with a 65 h.p. engine, and can be obtained both as a landplane and a seaplane. The figures below are for the landplane version. The seaplane has a cruising speed of 90 m.p.h. and an initial rate of climb, with full load, of 500ft./min.

| | |
|---|---|
| *Span* | 36ft. |
| *Length* | 21ft. |
| *All-up weight* | 1,150 lb. |
| *Useful load* | 480 lb. |
| *Max. speed* | 105 m.p.h. |
| *Cruising speed* | 95 m.p.h. |
| *Landing speed* | 35 m.p.h. |
| *Initial rate of climb* | 600ft./min. |

*Concessionaires: Aeronautical and Industrial Services (Southampton), Ltd., 194, Above Bar, Southampton.*

## FAIRCHILD

THE most recent Fairchild type to appear is the Trainer Model M.62. This is a low-wing tandem-seater monoplane with a welded-steel tube fuselage and a ply-covered wing with two different aerofoil sections. The tail surfaces are semi-cantilever, and the undercarriage is fixed. It is powered with a Ranger inverted six giving 165 h.p. at 2,450 r.p.m. Figures are given below.

The well-known 24 cabin machine is, of course, still in production. This is a strut-braced, high-wing cabin monoplane three-seater and is available at prices upwards of £1,750.

With a Ranger engine of about 165 h.p. the top speed is 134 m.p.h. and the cruising speed 126 m.p.h. The cruising range is 530 miles.

| | |
|---|---|
| *Span* | 36ft. |
| *Length* | 28ft. |
| *Weight empty* | 1,637 lb. |
| *All-up weight* | 2,300 lb. |
| *Range* | 5 hours |

*No performance figures available.*

*Concessionaires: Malcolm and Farquharson, Ltd., 601, Bath Road, Slough, Bucks.*

The new Fairchild trainer, which is a tandem-seater low-wing monoplane

## LUSCOMBE

UNLIKE the average American lightweight, in that it is of metal construction and has a monocoque fuselage, the Luscombe 8 is now available over here. It is a two-seater strut-braced cabin monoplane with a flat four Continental engine, either of 50 or 65 h.p.

In essentials it is not dissimilar to the higher-powered Luscombe models which are not entirely unknown in this country.

| | |
|---|---|
| *Span* | 35ft. |
| *Length* | 20ft. |
| *Weight, empty* | 650 lb. |
| *All-up weight* | 1,200 lb. |
| *Max. speed* | 109 m.p.h. |
| *Cruising speed* | 96 m.p.h. |
| *Landing speed* | 37 m.p.h. |
| *Initial rate of climb* | 750ft./min. |
| *Range* | 400 miles |

*Concessionaires: Aeronautical and Industrial Services (Southampton), Ltd., 194, Above Bar, Southampton.*

The Luscombe 8, which is the only all-metal American lightweight. The fuselage is a monocoque structure, but the wings are strut-braced.

## PIPER

ANOTHER American lightweight which has been gradually increased in power is the Piper Cub, which is now available with a 65 h.p. Continental. This is a conventional lightweight, seating two side by side in an enclosed cabin. Quite a number of the 50 h.p. models are being used for training in this country, and the figures below are for the coupé model with this engine. The 65 h.p. type has a maximum of 110 m.p.h., a cruising speed of 100 m.p.h., and an initial rate of climb of 1,000ft./min. Its price over here is £625.

*Span* ..... 36ft. 2in.
*Length* ..... 22ft. 6in.
*Weight, empty* . 710 lb.
*All-up weight* .. 1,200 lb.
*Max. speed* .... 93 m.p.h.
*Cruising speed* . 83 m.p.h.
*Landing speed* . 35 m.p.h.
*Initial rate of climb* ..... 500ft./min.
*Range* ..... 340 miles
*Price* ..... £590
*Concessionaire: A. J. Walter, Cub Airport, Watchfield, Nr. Swindon.*

**The Piper Cub is now being produced in 65 h.p. form. This is the 50 h.p. Coupé.**

*Flight* photograph

## STINSON

THE Reliant is now well known over here, and the 1939 model is very similar to previous models, though it has been considerably cleared up in detail. It is a luxurious four-seater powered either with a 260 h.p. Lycoming, 450 h.p. Wasp Junior, 450 h.p. Wright, 290 h.p. Lycoming, or 350 h.p. Wright—with varying performance accordingly. All models have c.p. or c.s. airscrews. The price of the 260 h.p. Lycoming-engined Reliant is £2,835.

Additionally, Stinsons are now producing a 75 h.p. lightweight, known as the 105. This is a high-wing cabin two-seater with built-in slots and balanced camber-changing flaps. The 105 has a cruising speed, with a Continental A.75, of 105 m.p.h. Its all-up weight is 1,485 lb., and range 420 miles. The price over here is £995.

*Concessionaires: Brian Allen Aviation Ltd., Hanworth Air Park, Feltham, Middx.*

**Cleaner lines for the new Reliant; notice the smooth engine cowling. Stinsons now produce a lightweight, known as the 105.**

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### The "Flamarion" on Test

IN its most recent test flight, Air France Transatlantique's landplane, the four-engined Farman 2234 *Camille Flamarion*, which was shortly due to make its first crossing of the North Atlantic, took off in 34 seconds from the Ishes aerodrome at an all-up weight of 23 tons. The run taken was just under 900 yards.

The *Camille Flamarion* is the second of the four Farmans ordered by Air France Transatlantique for experimental flights between France and New York, the first being the *Laurent Guerrero*, in which Codos flew from Paris to Chili last November in 2½ days. Paul Codos, who was chief pilot on the recent test, has been lent by Air France to take charge of the transatlantic company's landplane trials, and his second in command, Réné Charpentier, late of Air France's Lyons-Geneva feeder line, accompanied him.

Flying at sub-stratospheric altitudes, with the aid of a hermatically sealed pressure cabin, the *Flamarion's* four Hispano-Suiza 12Y engines of 920 h.p. each now give it a cruising speed of 175 m.p.h.

M. Louis Cartex, of Air France Transatlantique, has always maintained that the solution of an economic service across the North Atlantic rests with the landplane flying at over 20,00ft., so these pioneering experiments were awaited with interest.

### Pacific Survey

IN last week's issue we mentioned the fact that a Pan American Airways' Boeing 314, *California Clipper*, had left San Francisco on a survey flight to New Zealand. The machine reached Auckland at 3.50 a.m. (B.S.T.) on Wednesday of last week, after taking exactly a week for the journey via Honolulu, Caribou Island and Noumea, in New Caledonia.

The 314, which was expected to leave on the return journey last Saturday, carried, in addition to the crew of ten, twelve representatives of the American Government and P.A.A.

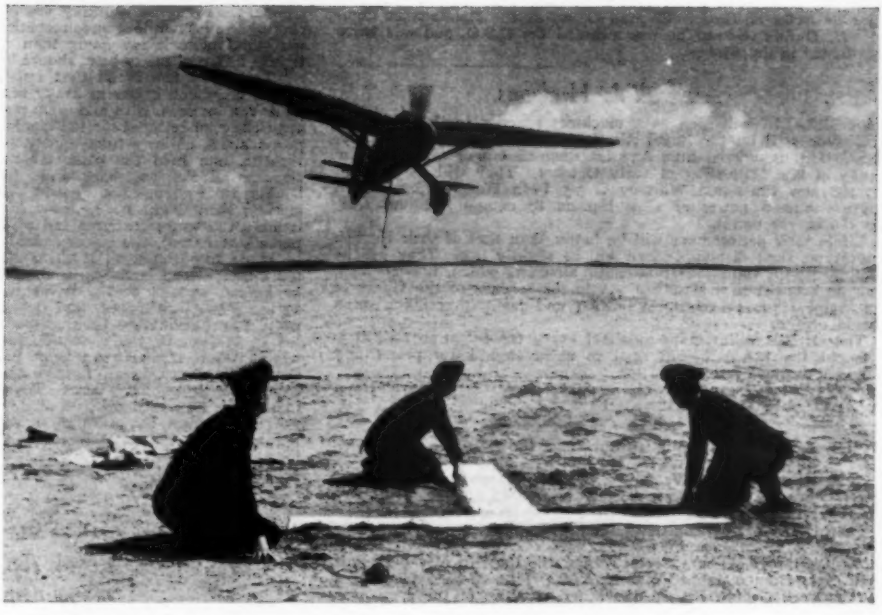
Meanwhile, the Short boat, *Aotearoa*, arrived at Auckland two days before the Boeing—on August 28. The machine, helped by a following wind, made the 1,360-mile crossing over the Tasman Sea from Sydney in less than eight hours. The *Aotearoa* left Southampton on August 16.

### Progress

THE extensive travels made by one of the various letters sent by *Flight* on the first British air mail service gives some idea of the speed of air travel—at least where letters, which require no sleep, are concerned. This letter duly arrived at its destination in Kansas City, about 4,500 miles from London, and was thence forwarded to Port Worth, Texas, and reforwarded to Philadelphia. It was posted on August 5 and reached Philadelphia on the 11th—making a trip of approximately 6,500 miles in six days.

# SERVICE AVIATION

*Royal Air Force and Official Announcements: Fleet Air Arm News: Military Aviation Abroad*



**OUT EAST: Despite preoccupation with the activities of the Royal Air Force comparatively near home we shall not forget the units overseas. Here is a Westland Lysander co-operating with the ground forces in the desert.**

## R.A.F. Mobilisation

A MOBILISATION of the Royal Air Force having been proclaimed, all airmen of the Royal Air Force Reserve (including the Volunteer Reserve) are required to proceed immediately to their places of joining without waiting for the receipt of their official notices to join (Form 472).

This order does not apply to Reservists who have received from the Officer-in-Charge of Records personal instructions as to their position on mobilisation, nor, of course, to Reservists and Auxiliaries already serving.

On presenting the cash order attached to Identity Certificates at the nearest Post Office (Money Order Office), Reservists will receive 5s. advance of pay. Railway or steamboat companies will, on presentation at booking offices of the railway warrants attached to identity certificates, issue tickets to places of joining.

The place of joining for Reservists who are in possession of identity certificates is that specified in their identity certificates. The place of joining for Reservists who are not provided with identity certificates has already been made known to them.

It is of the utmost importance in the present emergency that every Reservist shall join at the earliest possible moment and His Majesty's Government are confident that railway and other transport companies, employers and Reservists themselves will do all in their power to facilitate rapid mobilisation.

Regular officers, Warrant Officers, non-commissioned officers and airmen who are at present on leave from home units are required to return to their units at once without waiting for orders.

Officers on half-pay or on leave in this country from units overseas, if they have not already received instructions, are to report themselves in writing to the Permanent Under-Secretary of State for Air, Air Ministry (Dept. Q.J.).

Warrant Officers, non-commissioned officers and airmen on leave in this country from units overseas are to report themselves at the R.A.F. Depot, Uxbridge.

The whole of the Auxiliary Air Force, the Auxiliary Air Force Reserve, and the Women's Auxiliary Air Force, have already been called up. Any members of these air forces who have not yet received instructions are to report to their units immediately.

## Empire Auxiliary Units

IT is reported from Kenya that the auxiliary air unit has been called up and that an air unit has arrived from Southern Rhodesia to replace "that transferred to the R.A.F.," as the Nairobi correspondent of the *Daily Telegraph and Morning Post* puts it. The latest issue of the *Air Force List* gives the Straits Settlements Volunteer Force, but makes no mention of other Volunteer or Auxiliary Air Forces in the Colonies and Protectorates of the Empire. It is, however, only natural that such units should be formed in various places, and they will all add to the fighting strength of the British Empire. Even elementary reconnaissance in such lands may be of very great importance.

## Specialist Officers Wanted

THE Air Ministry announces that the Army and the Royal Air Force require technical officers for employment on engineering, armament or signals duties in emergency. Volunteers with the requisite technical qualifications will be enrolled in the Army Officers Emergency Reserve or the Royal Air Force Volunteer Reserve, as the case may be.

Candidates should apply at once to the War Office (A.G.12), Melbourne House, Aldwych, W.C.2, or to the Air Ministry, S.11 (e), Adastral House, Kingsway, W.C.2, giving full particulars of their qualifications, training and experience. Candidates who are engaged on the production of aircraft, engines or accessories, or on other important national work should not submit applications without first consulting their employers as to the possibility of their being spared for these Services in an emergency.

## Higher Appointments

THE Air Ministry announces the following appointments, which will take effect at the end of 1939 and early in 1940:—Air Marshal Arthur Sheridan Barratt, C.B., C.M.G., M.C., to be Air Officer Commanding, Air Forces in India, *vice* Air Marshal Sir Philip Bennet Joubert de la Ferte, K.C.B., C.M.G., D.S.O.

A.V-M. Alfred Guy Roland Garrod, O.B.E., M.C., D.F.C., to be Commandant, Royal Air Force Staff College, *vice* Air Marshal Arthur Sheridan Barratt, C.B., C.M.G., M.C.

Air Comdre. George Cyril Bailey, D.S.O., to be Director of Equipment, Air Ministry, *vice* A.V-M. Alfred Guy Roland Garrod, O.B.E., M.C., D.F.C.

*Air Marshal Barratt* was born at Peshawar in 1891. His association with the Air Force began in the Royal Flying Corps in June, 1914, and during the war he was awarded the M.C. and was four times mentioned in despatches. Having been engaged for some years on Air Staff duties at home and with the Shanghai Defence Force, he was posted to command No. 1 Group, India, in 1931. The following year he was appointed Senior Air Staff Officer at Headquarters, India. In 1935 he became Director of Staff Duties at the Air Ministry and has been Commandant of the R.A.F. Staff College since 1936. He became an Air Vice-Marshal in 1936 and was promoted to his present rank in July last year.

*A.V-M. Garrod* has wide experience of staff administration in the Royal Air Force. He was awarded the M.C. and the D.F.C. for war services, and from 1923 to 1927 he was an instructor at the Royal Air Force Staff College. After a period as Chief Instructor of the Oxford University Air Squadron, he was posted in 1931 to Iraq for Air Staff operational duties, and was awarded the O.B.E. for services in connection with operations in South Kurdistan. He attended the course at the Imperial Defence College in 1933 and subsequently served on staff duties at the Air Ministry. He was in command of the Armament Group and he has been Director of Equipment at the Air Ministry since March, 1938.

**Service Aviation**

*Air Comdre. Bailey* holds a B.Sc. degree with honours in engineering, and has had considerable experience on the engineering side of the Service. In 1922 he took a course of engineering instruction at the Royal Aircraft Establishment, and later attended the Imperial College of Science and Technology. In 1935 he became a Deputy Director of Equipment at the Air Ministry, and since last year he has been Senior Air Staff Officer at the Maintenance Command. During the war he was awarded the D.S.O. and was twice mentioned in despatches.

## *Australia's Hudsons*

AUSTRALIA will soon have machines superior to those of their type used by the Royal Air Force. These are the fifty Lockheed Hudsons ordered from America some time ago, which are due either in late September or early October. They will be powered by the new Pratt and Whitney G 3-5 Twin Wasp engine, which gives a take-off power of 1,050 h.p. on 87 octane fuel and 1,200 on 100 octane petrol.

While their performance will be better than that of their English prototype, their disposable load will be slightly less. They will be equipped with Hamilton Hydromatic airscrews which, it is claimed, can be brought to a standstill within ten seconds of the failure of an engine, thus preventing vibration and facilitating flying on a single engine.

The engines will require overhaul every 600 hours so that it is thought the R.A.A.F. will need 20 extra engines for power unit changes during overhaul.

## *Flying Accidents*

THE Air Ministry regrets to announce the following flying accidents:—

Acting Sgt. Anthony Frederick Adrian Freeman lost his life and P/O. Thomas Watson was severely injured in an accident which occurred in East Anglia on August 29 to an aircraft of No. 149 Squadron. P/O. Watson was a pilot of the aircraft and Acting Sgt. Freeman a member of the crew.

F/O. Francis William Scott Turner, the Captain of the aircraft, and Sgt. Horace James Weller, A/C.2 John Gerard Hoey, and A/C.2 Cecil George Barker, the other members of the crew, were not injured.

Sgt. Cyril Douglas Gower (flying solo) lost his life in an accident which occurred at Grays, in Essex, on August 30, to an aircraft of No. 74 Squadron.

Flt. Sgt. Thomas Richard Watkin Owens and Mr. Roger John Gillingham lost their lives in an accident which occurred at Horley on August 30 to an aircraft of No. 19 Elementary and Reserve Flying Training School.

## *Rough-water Operation of Flying Boats*

THE following letter was written to his company by "Bill" Wheatley, chief test pilot and service manager of the Consolidated Company, which built the Model 28-5 (PBY) flying boat now on test at Felixstowe:—

"In response to your request of July 29 for 'a report covering your ideas of best flight practices for PBY including Navy practices for rough-water landings and take-offs, etc. . . . to forward to England,' I would like to point out that there are no 'tricks' about rough-water operation, and that, as far as I know, I do not possess, and the Navy does not possess, any knowledge of any technique not generally known and followed. In other words, I believe that the English know as much about rough-water handling as I do or as our Navy does, and there is little that we can set down on paper that will be helpful to them, as we have no special technique or knowledge that they do not already fully understand.

"The PBY seems to be able to withstand the pounding of landings and take-offs with any load up to normal design gross, 27,000 lb., in waves up to approximately five feet. Probably no damage will result from take-offs and landings in heavier seas, although, as the sea becomes rougher, the outcome of such take-offs and landings become more a matter of luck than a sure, safe operation. Little in the way of technique can play any part in determining whether operations in seas heavier than about five feet will be uneventful or result in damage. The English are very unlikely to encounter conditions like our familiar Pacific Ocean swells, and the waves they are likely to find will be more like those found along the Atlantic seaboard. Without a heavy swell the PBY can withstand large choppy waves without much chance of damage. The plane will withstand more heavy going than the passengers, and the use of tightly adjusted safety-belts should be insisted upon for all aboard.

"The Navy has found that full-stall landings, with or without power, are much better in heavy seas than the fast landing. The plane can be flown with minimum power a few feet off the wave tops until the spot selected for the landing is reached. Then reduce the power about halfway from minimum power for flight to fully idled throttle, and hold the plane off as long as possible, pulling the elevator all the way back and making an accentuated full stall landing from about 10 to 15 feet. This will result in a much softer landing than might be expected, and as soon as the plane's tail touches the water (extreme tail of hull, just below rudder, should touch water first), the power should be fully cut. Landings should be made into the wind if there is enough wind to be of use in reducing speed of landing. If there isn't much wind, the plane can be landed parallel to the swells if any (cross wind usually) and as the plane loses speed, and before it comes off the step, downwind rudder should be fully applied.

"In taking off, the elevator control should be held fully back while opening throttles to take-off manifold pressure, then the wheel should be moved ahead to give the planing angle determined by experience to be best. When sufficient speed has been attained the plane may be pulled off if desired. Take-offs should be made into the wind unless the wind is so light that taking off cross wind parallel to the swells is feasible. Under this condition the water speed will be high in any case, and less beating will result from taking off parallel with the swells, either on crest or in the trough."

## *Royal Air Force Intelligence*

### *Royal Air Force*

*General Duties Branch*

The following are granted short-service commissions as Pilot Officers for five years on the active list (August 16):—G. M. Allcock, W. I. Anstey, D. W. S. Clark, V. A. Cunningham, V. B. de la Perrelle, W. A. Foster, J. F. Gavin, T. F. Gill, J. C. F. Hayter, J. E. Hull, H. L. Oakley, B. W. Peryman, D. L. Prichard, R. W. Roots, A. K. Round, A. E. Wickham.

The following Flying Officers are promoted to the rank of Flight Lieutenant on the dates stated:—E. C. Eaton (Acting Flight Lieutenant) (July 13); R. N. Cook (Acting Flight Lieutenant) (July 19); H. D. Cooke (Acting Flight Lieutenant) (August 16); E. A. Whiteley (August 21).

The following Pilot Officers are promoted to the rank of Flying Officer on the dates stated:—J. F. Dilworth (since granted the acting rank of Flight Lieutenant) (May 26); T. A. Heath (May 28); T. W. La B. Bamford, F. J. Lucas, H. E. H. Overall (July 12); N. Johnson, E. J. Kain (July 21); J. A. Piddington (July 25); A. C. H. Haines (August 4); J. Harrington, G. T. Stanley (August 16); C. Scragg (Acting Flight Lieutenant), D. King (August 24).

F/O. R. V. Jeff is granted the acting rank of Flight Lieutenant (May 31).

The following Flying Officers relinquish the acting rank of Flight Lieutenant on the dates stated:—R. N. Stidolph (May 9); D. S. MacDonald (July 23); I. T. B. Rowland, D. P. Bamber (August 17); J. H. Wedgwood (August 22).

P/O. G. Tanner relinquishes the acting rank of Flight Lieutenant (July 10); F/O. F. J. Lucas relinquishes his short-service commission on transfer to the Royal New Zealand Air Force (July 23); Acting Pilot Officer on probation A. de L. B. Maufe relinquishes his short-service commission on account of ill-health (August 26); the short-service commission of Acting Pilot Officer on probation G. Griffiths is terminated on cessation of duty (August 22).

**EMPIRE DEFENCE: One of the new Saunders-Roe Lerwick long-range flying boats (two Bristol Hercules) which will be used for over-sea reconnaisance, patrol and bombing. The Lerwick is amongst the fastest flying boats in the world and is exceptionally well defended.**

*Equipment Branch*

The following are granted short-service commissions as Acting Pilot Officers on probation (August 17):—R. H. Aird, D. E. Allsopp, T. J. da C. Andrade, A. E. Arnott, F. N. Baird, F. F. Baker, P. C. Barlow, O. E. Bartlett, A. C. Bartrum, H. G. Belcher, H. G. Cadwallader, N. V. Carter, P. Cartridge, J. C. Chamberlain, J. P. Conway, W. M. Dallas, G. D. Dillabough, C. H. Edwards, P. J. Finn, F. J. Ford, B. P. Fortescue, C. J. T. Giddings, C. M. Gilbert, T. J. Goggin, A. A. G. Goodall, J. H. G. Brown, R. M. Hall, M. C. Hart, C. S. Hatfield, B. McA. Hodge, R. C. Hodgson, D. C. A. Howden, F. D. Hynes, C. W. Laing, B. H. Lawrence, R. Lee, T. T. Leigh-Mallory, P. K. McCreton, J. W. Mackay, P. A. Mason, I. H. Matheson, J. S. Miller, W. J. Nightingale, D. K. Petty, D. F. St. J. Pigott, A. L. Prince, P. Prince, C. S. Reade, R. G. Reid, W. A. W. Reid, A. M. Roberts, D. S. Sanderson, R. O. Snape, G. W. Stoddard, E. J. G. Symonds, R. J. Tilley, W. C. Trevitt, P. G. Tyler, P. Weaver, A. Yates.

*Accountant Branch*

Pilot Officer on probation H. E. Kelsey is confirmed in his appointment and promoted to the rank of Flying Officer (June 10); F/O. S. M. MacIldowie relinquishes the acting rank of Flight Lieutenant (August 11).

*Medical Branch*

E. H. Lamb, M.B., Ch.B., is granted a short-service commission as Flying Officer for three years on the active list and is seconded for duty at the London Homœopathic Hospital (August 4).

*Chaplains Branch*

The Rev. J. J. Strong is granted a short-service commission with the relative rank of Squadron Leader (August 17).

*Commissioned Engineer Officers*

The following Warrant Officers are granted commissions as Flying Officers on probation with effect from the dates stated and with seniority of June 12:—N. Gardner, D.F.M., W. W. T. Sawyer, C. R. Saddington (August 12); G. A. V. Collins (August 16); R. W. Hancock (August 19).

*Commissioned Signals Officer*

W/O. F. W. Hudson is granted a commission as Flying Officer on probation with effect from August 16 and with seniority of June 12.

*Commissioned Armament Officer*

W/O. A. E. Hewes is granted a commission as Flying Officer on probation with effect from August 16, and with seniority of June 19.

## Royal Air Force Reserve

RESERVE OF AIR FORCE OFFICERS

*General Duties Branch*

P. E. Grenfell is granted a commission as Flying Officer in Class A with effect from August 15, and with seniority of March 18, 1932.

The following are granted commissions in Class CC as Flight Lieutenants on the dates stated:—Lt.-Col. G. L. Torrens, D.S.O. (R.A.R.O.) (June 29); Capt. J. B. McKay (R.A.R.O.) (July 3).

F/O. J. Evason (R.A.F., Ret.) is granted a commission in Class CC as Flying Officer (August 23, 1938); F/O. R. L. Moss is transferred from Class AA to Class C (February 3).

The following Flying Officers relinquish their commissions on completion of service on the dates stated:—F. Brent (August 6); K. T. Murray (August 13).

## Royal Air Force Volunteer Reserve

*General Duties Branch*

T. D. Trouncer is granted a commission as Flying Officer with effect from August 22, and with seniority of February 22, 1936.

*Administrative and Special Duties Branch*

Pilot Officer on probation T. E. Pennington is granted the acting rank of Squadron Leader (paid) and is employed with the Royal Air Force (August 3) (substituted for the notification in the *Gazette* of August 8); P/O. J. W. Paddon resigns his commission (July 17).

*Medical Branch*

The following are granted commissions as Flying Officers (August 29):—W. W. Mackinlay, M.B., Ch.B., N. E. Stidolph, B.M., B.Ch.

*Dental Branch*

The following are granted commissions as Flying Officers (August 29):—A. G. Clark, L.D.S., J. W. Cunningham, L.D.S., R.F.P.S., N. E. Gillham, L.D.S., F. L. Hossell, L.D.S., J. Liddiard, L.D.S., B. W. P. Roberts, L.D.S., D.D.S., J. A. R. Smit, L.D.S.

## Auxiliary Air Force

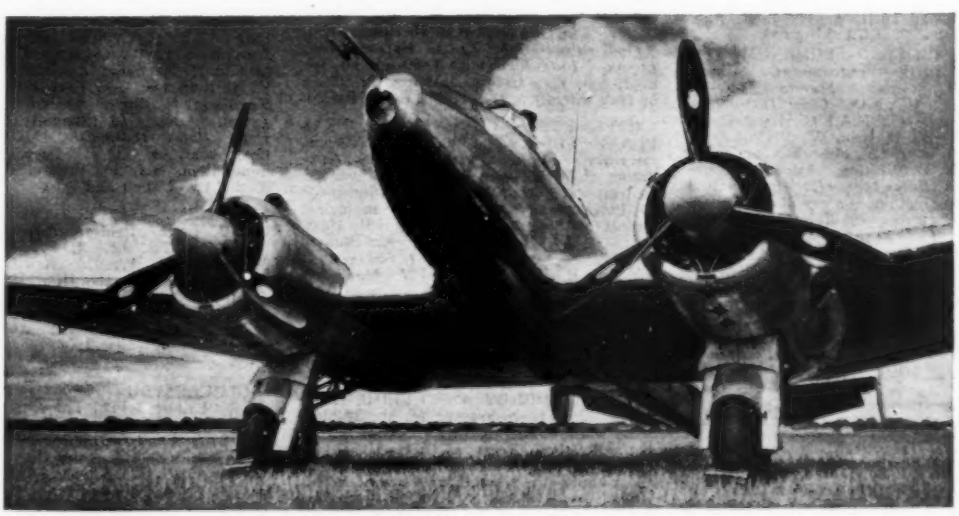
*General Duties Branch*

Flt. Lt. J. Evason relinquishes his commission on appointment to a commission in the Reserve of Air Force Officers (August 23, 1938).

No. 616 (SOUTH YORKSHIRE) SQUADRON.—P/O. E. F. St. Aubyn is promoted to the rank of Flying Officer (June 10). No. 905 (COUNTY OF SURREY) SQUADRON.—The following are granted commissions as Pilot Officers on the dates stated:—T. V. Fitch (June 2); C. F. Pennell (August 15). No. 906 (COUNTY OF MIDDLESEX) SQUADRON.—J. A. Nicholson is granted a commission as Acting Pilot Officer (August 16). No. 911 (COUNTY OF WARWICK) SQUADRON.—F. D. Yates is granted a commission as Flying Officer (July 11). No. 913 (COUNTY OF WARWICK) SQUADRON.—C. H. Denham is granted a commission as Pilot Officer (July 25). No. 914 (COUNTY OF WARWICK) SQUADRON.—Flt. Lt. B. K. Parsons is promoted to the rank of Squadron Leader and appointed to the command of the Squadron (June 6). No. 915 (COUNTY OF WARWICK) SQUADRON.—Flt. Lt. R. Yates, M.C., M.M., is promoted to the rank of Squadron Leader and appointed to the command of the Squadron (June 7). No. 916 (COUNTY OF WARWICK) SQUADRON.—Flt. Lt. J. J. Lloyd is promoted to the rank of Squadron Leader and appointed to the command of the Squadron (June 8). No. 917 (COUNTY OF WARWICK) SQUADRON.—The Rt. Hon. Lord Iliffe, C.B.E., is appoi ed Honorary Air Commodore (August 29). No. 928 (COUNTY OF GLOUCESTER) SQUADRON.—Maj. E. Cadbury, D.S.C., D.F.C., is appointed Honorary Air Commodore (August 29). No. 934 (COUNTY OF DEVON) SQUADRON.—L. P. Garbett is granted a commission as Acting Pilot Officer (July 7). No. 940 (WEST RIDING) SQUADRON.—R. V. Proctor is granted a commission as Pilot Officer (August 14). No. 946 (CITY OF GLASGOW) SQUADRON.—J. R. P. Mitchell is granted a commission as Pilot Officer (August 8). No. 947 (CITY OF GLASGOW) SQUADRON.—S. G. Mackley is granted a commission as Pilot Officer (April 18).

*Equipment Branch*

No. 902 (COUNTY OF LONDON) SQUADRON.—G. T. Crouch is granted a commission as Flying Officer (August 14).



**ALLIED EQUIPMENT : A Potez 63 multi-purpose monoplane as used in large numbers by *l'Armee de l'Air*. The two bulges below the fuselage are fairings for 20 mm. Hispano shell-guns.**

# THE CLUBS AS THEY WERE

## *The Various C.A.G. and Other Civil Training Centres Listed Under the Towns Which are Served*

WHAT will be the fate of the sixty-odd flying clubs listed below is at present uncertain. That some will be required to carry on with *ab initio* training for the Service is to be expected. But it must of necessity take some little time to rationalise that organisation and to select those clubs which can usefully contribute to the nation's present and future needs. In the meantime this review will form an interesting document when, at some future date, private flying can be resumed.

**ABERDEEN.**—NORTH BRITISH AERO CLUB, LTD., Dyce, Aberdeen. *Secretary*: C. Brunning. *Chief Instructor*: M. F. S. Davie. *Chief Engineer*: C. Goodall. *Annual subscription*: £2 2s. *Entrance fee*: £2 2s. *Rates* (*normal*): £3 per hour dual, £2 15s. solo. *Rates* (*C.A.G.*): Normal.

**BARNSTAPLE.** — BARNSTAPLE AND N. DEVON FLYING CLUB, Barnstaple Aerodrome. *Secretary*: W. J. Bond. *Chief Instructor*: R. T. Boyd. *Assistant Instructors*: L. De Labilliere. *Chief Engineer*: W. H. Helon. *Annual subscription*: £1 1s. per year. *Rates* (*normal*): £2 per hour dual, 27s. 6d. solo. *Rates* (*C.A.G.*): 5s. week-ends and week-days.

**BEDFORD.**—BEDFORD SCHOOL OF FLYING, Barton Aedrodrome, Beds (and Eaton Bray aerodrome). *Secretary*: Miss D. O. Summers. *Senior Instructor*: T. A. Evans-Freke. *Assistant Instructors*: E. H. Peet, G. D Garnett and E. Knight Bruce. *Chief Engineer*: A. R. Sarup. *Entrance Fee*: £1 1s. *Subscription*: £1 1s. *Rates* (*normal*): £2 per hour. *Rates* (*C.A.G.*): Normal.

**BELFAST.**—THE NORTH OF IRELAND AERO CLUB, LTD., Ards Airport, Newtownards, Co. Down. *Secretary*: S. W. Ogden. *Chief Instructor*: S. W. Ogden. *Chief Engineer*: H. Forrest. *Annual subscription*: £3 5s. *Entrance fee*, £3. *Rates* (*normal*): £2 per hour dual, £1 15s. solo. *Rates* (*C.A.G.*): Normal.

**BIRMINGHAM.**—THE MIDLAND AERO CLUB, LTD., Birmingham Municipal Airport, Elmdon, and Wolverhampton Municipal Airport, Barnhurst. *Secretary*: W. H. Sutcliffe. *Chief Instructor*: W. H. Sutcliffe. *Assistant Instructors*: D. R. McCartney, T. V. Mitchell, K. H. Cox, E. P. Lane and J. Verney-Cave. *Annual subscription*: Flying £4 4s., ordinary £2 2s. *Rates* (*normal*): Dual, £2 per hour, solo, £1 10s. *Rates* (*C.A.G.*): Normal.

**BOURNEMOUTH.** — BOURNEMOUTH FLYING CLUB, Bournemouth Airport, Christchurch, Hants. *Secretary*: F. C. Fisher, F/O., R.A.F.O. *Chief Instructor*: F. C. Fisher, F/O., R.A.F.O. *Assistant Instructors*: E. K. P. Ince, W. S. Coates, D. Biggart and R. A. F. Farquharson. *Chief Engineer*: E. D. Whiting. *Annual subscription*: £2 2s. *Rates* (*normal*): *Ab initio* and advanced instruction, £2 per hour; instrument flying, £2 10s., solo flying from £1 10s. *Rates* (*C.A.G.*): Normal.

**BRISTOL.**—THE BRISTOL AND WESSEX AEROPLANE CLUB, LTD., Bristol Airport. *Secretary*: L. R. Williams. *Chief Instructor*: E. M. H. Slade. *Assistant Instructors*: D. K. Robertson and D. A. Taylor. *Chief Engineer*: None. Aircraft maintained by Airwork. *Annual subscription*: Pilots, £3 3s. Ordinary, £2 2s. *Entrance fee*: Pilots, £3 3s *Rates* (*normal*): Dual, £2 2s. an hour; solo, 35s. and 30s. "B," blind-flying and instructor's courses available. *Rates* (*C.A.G.*): 5s. standard.

**BURY ST. EDMUNDS.**—WEST SUFFOLK AERO CLUB, LTD., Municipal Airport, Bury St. Edmunds. *Secretary*: F. Steward. *Chief Instructor*: E. C. N. M. Prentice. *Chief Engineer*: C. W. Sheldrick. *Annual subscription*: £1 1s. *Rates* (*normal*): Dual, 35s. per hour: solo, 20s. *Rates* (*C.A.G.*): 2s. 6d. week-days and Sundays.

**CAMBRIDGE.** — CAMBRIDGE AERO CLUB, LIMITED, Cambridge Aerodrome. *Secretary*: Mr. R. G. Bowles. *Chief Instructor*: Mr. L. V. Worsdell. *Assistant Instructors*: Messrs. I. Gliddon and S. Sanders. *Chief Engineer*: Mr. S. F. Wilkinson. *Annual subscription*: £2 2s. *Entrance fee*: £2 2s. *Rates* (*normal*): £1 10s. per hour, £2 (non-subsidised flying). *Rates* (*C.A.G.*): 2s. 6d. week-days, 5s. Sundays.

UNIVERSITY AERO CLUB, LTD., Cambridge Aerodrome. *Secretary*: Mr. P. Gipson. *Chief Instructor*: Mr. D. V. Hewlett. *Assistant Instructor*: Mr. G. C. Wright. *Chief Engineer*: Mr. E. F. Smith. *Annual subscription*: £2 2s. *Entrance fee*: £2 2s. *Rates* (*normal*): £1 10s. per hour, £2 (non-subsidised flying). *Rates* (*C.A.G.*): 2s. 6d. week-days, 5s. Sundays.

**CANTERBURY.** — KENT FLYING CLUB, Canterbury Aerodrome, Bekesbourne, Kent. *Secretary*: J. L. A. Pratt. *Chief Instructor*: H. Chater. *Assistant Instructor*: E. G. Drew. *Chief Engineer*: L. R. Honour. *Entrance fee*: £1 1s. *Annual subscription*: £1 1s. *Rates* (*normal*): £2 per hour dual, £1 10s. solo. *Rates* (*C.A.G.*): 5s. at all times.

**CARDIFF.** — CARDIFF AEROPLANE CLUB, LTD., Cardiff Airport, Cardiff. *Secretary*: Arthur S. Davies, A.C.I.S. *Chief Instructor*: G. N. S. Kemp. *Assistant Instructor*: W. R. Barley. *Chief Engineer*: G. E. Watkins. *Entrance fee*: (Flying) £3, (social) £1. *Subscription*: (Flying) £3 3s., (social) £1 1s. *Rates* (*normal*): Dual £2 per hour, solo £1 5s. *Rates* (*C.A.G.*): Dual and solo 5s.

**CARLISLE.**—BORDER FLYING CLUB, Carlisle Airport, Carlisle, Cumberland. *Hon. Secretary and Treasurer*: W. C. Mison, Esq. *Chief Instructor*: Flt. Lt. S. H. Potter. *Chief Engineer*: R. B. Brown, Esq. *Annual subscription*: £3 3s. *Entrance fee*: £1 1s. *Rates* (*normal*): Dual 37s. 6d. per hour, solo 32s., and 25s. after 30 hr. flown in club aircraft. *Rates* (*C.A.G.*): Normal.

**COVENTRY.** — COVENTRY AEROPLANE CLUB, 25, Wainbody Avenue, Coventry. *Flying Centre*: Whitley Aerodrome (Howe's Lane entrance), Coventry. In temporary occupation. Application made to Corporation for transfer to municipal airport at Baginton. *Secretary*: P. Haselock. *Chief Instructor*: T. A. Stewart (leaving Sept. 18). *Assistant Instructors*: Flt. Lt. R. S. Higgins and A. V. Jones. *Chief Engineer*: R. Moore. *Annual subscription*: Flying members £2 2s., ordinary members £1 1s. No entrance fee. *Rates* (*normal*): Taylorcraft 35s. dual, 25s. solo; Tiger 40s. dual, 30s. solo. *Rates* (*C.A.G.*): Normal.

**DERBY.**—DERBY AERO CLUB, LTD., Derby Airport. *Secretary*: M. M. Hutchinson. *Full Time Instructor*: Miss P. M. Bennett. *Full Time Instructors*: H. R. Harben and M. M. Hutchinson (directors of the company). *Chief Engineer*: A. Webb. *Annual subscription*: £3 3s. (no entrance fee). *Rates* (*normal*): £2 per hour dual, 30s. solo. *Rates* (*C.A.G.*): 5s.

**DONCASTER.** — DONCASTER AERO CLUB, Municipal Airport, Doncaster. *Secretary*: H. C. C. MacLeod. *Chief Instructor*: J. H. Hicklin. *Assistant Instructor*: O. H. Gutekunst. *Chief Engineer*: J. G. Stephens. *Entrance fee*: (flying) £3 3s., (associate) £1 1s. *Annual subscription*: (flying) £3 3s., (associate) £1 1s. *Rates* (*normal*): B.A. Swallows, 35s. per hour dual, 30s. solo; Moth Minor, 45s. dual, 40s. solo. *Rates* (*C.A.G.*): 5s. dual and solo.

**DUBLIN.**—IRISH JUNIOR AVIATION CLUB, 7, Crampton Quay, Dublin. *Flying Centre*: Weston Park, Leixlip (Lucan), Co. Kildare (10 miles W. of Dublin on Dublin - Celbridge Road). *Secretary*: Chris. F. Bruton. *Chief Instructor*: P. W. Kennedy. *Annual subscription*: (under 21) 5s., (over 21) 10s. *Entrance fee*: (under 21) 2s. 6d., (over 21) 5s. *Rates* (*normal*): Dual and solo £1 10s. per hour. *Rates* (*C.A.G.*) (Flying Section Scheme): 2s. per week for 1½ years (at some time during this period members are taught to fly). Additional entrance fee of 5s. (The I.J.A.C. does not own any aircraft nor has it a permanent instructor. The machines used are loaned or hired and the instructor owns the two Swallows and the aerodrome at Weston Park.)

**EASTBOURNE.**—EASTBOURNE FLYING CLUB, LTD., 21, Gildredge Road, Eastbourne. *Flying Centre*: Wilmington Aerodrome, Sussex. (New hangars, offices, etc., now being erected and aerodrome being enlarged and improved.) *Secretary*: Norman E. Carter. *Chief Instructor*: F/O. O. T. Hazell. *Assistant Instructors*: T. G. Stubley, S. C. Wildgoose and V. H. Jefferies. *Chief Engineer*: S. C. Wildgoose. *Annual subscription*: (flying) £2, (non-flying) £1. *Rates* (*normal*): Dual £2 per hour, solo £1 15s. (£1 10s. after 25 hr. solo), blind flying £2 10s. *Rates* (*C.A.G.*): Normal.

**FOLKESTONE.**—CINQUE PORTS FLYING CLUB, Lympne Airport, Kent. *Secretary*: T. W. Osborn. *Chief Instructor*: R. M. Hackney. *Assistant Instructors*: K. J. Robertson and Robert Bruce. *Chief Engineer*: L. Birch. *Annual subscription*: £3 3s. (flying), £2 (ground) (no entrance fee). *Rates* (*normal*): Dual, 40s per hour; solo, 30s. ("B" licence instruction undertaken, including night flights.) *Rates* (*C.A.G.*): 5s. dual and solo.

**GLASGOW.**—THE SCOTTISH FLYING CLUB, LTD., Renfrew Airport, Renfrew. *Secretary*: Flt. Lt. R. F. Millen. *Chief Instructor*: A. Wren. *Assistant Instructors*: L. Orr and the Hon. Mrs. M. Fairweather. *Chief Engineer*: H. P. Train. *Annual subscription*: Pilot £4, Associate £2. *Entrance fee*: Pilot, £3; Associate, £2. *Rates* (*normal*): Dual, £2 per hour; solo, £1 10s. *Rates* (*C.A.G.*): 5s. per hour.

**GLOUCESTER.**—THE COTSWOLD AERO CLUB, LTD., The Airport, Cheltenham Road, Gloucester. *Secretary*: N. E. Goddard. *Chief Instructor*: W. R. Walwin, F/O. R.A.F.O. *Assistant Instructors*: J. J. Wallis and F. C. Hanbury. *Chief Engineer*: J. J. Wallis. *Annual subscription and/or entrance fee*: *Entrance fee*, £1 1s.; *Subscription*, £2 2s. *Rates* (*normal*): (training types), £2 per hour dual, £1 10s. solo; (others) £2 dual, £1 15s. solo. *Rates* (*C.A.G.*): 5s. at all times.

**GRIMSBY.** — LINCOLNSHIRE AERO CLUB, Airport, Waltham, Lincs. *Secretary*: F.E. Darlow. *Chief Instructor*: F/O. H. B. G. Michelmore. *Assistant Instructors*: E. H. Galley, G. E. Brown and H. W. Smethurst. *Chief Engineer*: B. D. Whittaker. *Annual subscription*: £1 1s. *Rates* (*normal*): £2 per hour dual, £1 10s. solo. *Rates* (*C.A.G.*):

**HARTLEPOOL.**—THE HARTLEPOOLS AND TEES-SIDE FLYING CLUB, The Aerodrome, West Hartlepool. *Secretary*: H. Ley Wilson. *Chief Instructor*: L. E. Headley. *Assistant Instructor*: L. Larsen. *Chief Engineer*: R. L. Whyham. *Annual subscription*: Under consideration. Temporary club accommodation available; permanent clubhouse in course of erection. *Rates* (*normal*): 30s. per hour. *Rates* (*C.A.G.*): 5s. per hour.

**HULL.** — HULL AERO CLUB (1934), LTD., Municipal Airport of Hull, Hedon, Hull. *Secretary*: Sq.-Ldr. G. E. S. Lamb. *Chief Instructor*: Flt. Lt. A. F. Powell. *Assistant Instructor*: T. E. Richardson. *Chief Engineer*: J. B. Sims. *Annual subscription*: (flying) £2 2s., (associate) 10s. 6d. *Rates* (*normal*): 35s. per hour; special contract rates. *Rates* (*C.A.G.*): 5s. per hour.

**ISLE OF WIGHT.** — THE ISLE OF WIGHT FLYING, LTD., Lea Airport, Sandown. *Secretary*: S. J. Noel-Brown. *Chief Instructor*: V. N. Dickinson. *Assistant Instructor*: R. Ward. *Chief Engineer*: G. E. Gazzard. *Annual subscription*: 5s. *Rates* (*normal*): Dual 50s. per hour, solo 30s. *Rates* (*C.A.G.*): 5s. weekdays and Sundays.

**LEICESTER.**—THE LEICESTERSHIRE AERO CLUB, LTD., The Airport, Leicester. *Hon. Secretary*: R. A. Marks. *Chief Instructors*: J. F. Carroll. *Chief Engineer*: Thos. Warren. *Annual subscription*: Pilots, £3 3s.; Observers, £1 1s. *Entrance fee*: Observers only, £2 2s. *Rates* (*normal*): 30s. per hour. Solo and advanced dual: 24s. *Rates* (*C.A.G.*): Normal.

COUNTY FLYING CLUB, LTD., 16, New Street, Leicester. *Flying Centre*: Rearsby Aerodrome, Leics. *Hon. Secretary*: W. M. Fraser. *Chief Instructor*: R. Pierce. *Assistant Instructor*: H. Mercier. *Chief Engineer*: E. Mullins. *Annual subscription*: £2 2s. (flying), £1 1s. (associate). *Rates* (*normal*): £1 per hour. *Rates* (*C.A.G.*): 2s. 6d. throughout.

**LIVERPOOL.**—LIVERPOOL AND DISTRICT AERO CLUB, Liverpool Airport, Liverpool, 19, and at Hooton Park Aerodrome, Cheshire. *Secretary*: J. Cuthbertson. *Chief Instructor*: G. Clapham. *Assistant Instructors*: A. V. Heaton, D. Greenhalgh, R. Bell and P. J. Grenside. *Chief Engineer*: A. K. R. Frith. *Annual subscription*: Full, £5 5s.; Associate, £2 2s. *Entrance fee*: £3 3s. *Rates* (*normal*): 36s. per hour dual and solo. *Rates* (*C.A.G.*): Normal.

**LONDON.**—AIRWORK FLYING CLUB, LTD., Heston Airport, Hounslow, Middx. (and a branch, for normal and C.A.G. flying, at Denham, Bucks). *Secretary*: Mr. L. Cumming. *Chief Instructor*: Flt. Lt. B. A. Davy, R.A.F.O. *Assistant Instructors*: Mr. W. B. Fordham and Mr. P. B. Elwell. *Chief Engineer*: Mr. A. Cleaver. *Annual subscription*: £5 5s. *Entrance fee*: £2 2s. *Rates* (*normal*): Dual, £2 5s. per hour; solo, £1 15s. *Rates* (*C.A.G.*): 5s., including week-ends.

AUTOGIRO FLYING CLUB, LTD., London Air Park, Feltham, Middx. *Secretary*: R. Blake. *Assistant Secretary*: C. Hasler. *Chief Instructor*: H. A. Marsh. *Assistant Instructors*: M. J. B. Stoker, F. J. Cable, and R. A. C. Brie (occasional). *Chief Engineer*: A. T. Stone. *Annual subscription*: None. *Rates* (*normal*): £3 per hour, dual and solo. *Rates* (*C.A.G.*): 5s. weekdays, 7s. 6d. Saturday and Sunday.

BROOKLANDS FLYING CLUB, Brooklands Aerodrome, Weybridge, Surrey. *Secretary*: H. F. Gibson. *Manager*: Capt. R. Y. Bush. *Chief Instructor*: K. H. F. Waller. *Instructors*: G. Bremridge, L. T. Cliff and F. Fox. *Chief Engineer*: J. Garnet Hall. *Annual subscription*: £4 4s. (flying), £2 2s. (social), £1 1s. (monthly) flying member. Includes membership of associated clubs. *Rates* (*normal*): £2 5s. per hour, dual and solo. Navigational (1st and 2nd class) training facilities.

THE HERTS AND ESSEX AERO CLUB, Broxbourne Aerodrome, Nazeing, Waltham Cross. *Secretary*: F. E. Darlow. *Chief Instructor*: D. A. D. Cather. *Assistant Instructors*: M. O'Donovan and E. H. Statham. *Chief Engineer*: W. S. Ogilvie. *Annual subscription*: £1 1s. (no entrance fee). *Rates* (*normal*): Dual, £2 per hour; solo, £1 10s. *Rates* (*C.A.G.*): Normal.

HORTON KIRBY FLYING CLUB, LTD., The Aerodrome, Horton Kirby, nr. Dartford. *Secretary*: D. S. Alexander. *Chief Instructor*: G. W. Alexander. *Assistant Instructors*: R. T. Dew, P. B Chubb. R. R. Mitchell, R. Mountford and G. Howard. *Chief Engineer*: D. J. Adie. *Annual subscription*: £2 2s. *Entrance fee*: £1 1s. *Rates* (*normal*): Gipsy Moths, dual 50s. per hour., solo 40s.; Puss Moths, dual 60s., solo 50s.; Tiger Moths, dual 60s., solo 50s. Facilities for "B" licence, blind, night flying, and instructor's courses. *Rates* (*C.A.G.*): Dual and solo, 5s. throughout.

THE INSURANCE FLYING CLUB, LTD., 20, Aldermanbury, E.C.2. *Flying Centre*: Gatwick Airport, Horley, Surrey. *Secretary*: S. K. Wiltshire. *Chief Instructor*: R. Harris. *Assistant Instructors*: S. K. Wiltshire and G. E. Clair. *Annual subscription*: £1 1s. each. *Entrance fee*: £1 1s. *Rates* (*normal*): 30s. per hour dual and solo. *Rates* (*C.A.G.*): 2s. 6d. mid-week, 5s. week-ends.

THE LONDON AEROPLANE CLUB, Hatfield Aerodrome, Herts. *Secretary*: E. W. Rodwell. *Chief Instructor*: Flt. Lt. J. A. Harris. *Assistant Instructors*: J. Goodyear, J. Storey, G. H. Westlake, I. Kestin and H. Greenshields. *Chief Engineer*: F. C. Keating. *Annual subscription*: £3 3s. *Entrance fee*: £3 3s. *Rates* (*normal*): £2 per hour dual, £1 10s. solo. *Rates* (*C.A.G.*): Normal.

LONDON AIR PARK FLYING CLUB, Hanworth Aerodrome, Feltham, Middlesex. *Secretary*: (Company) Mr. H. J. Madge; (Club) Miss V. F. Bish. *Chief Instructor*: J. M. St. Kearney. *Assistant Instructors* (part time): B. P. Buchegger, James Rush, J. K. Keates, E. G. B. Reid, F. Brookes, D. Stewart, J. B. Collins and F. V. Lister. *Chief Engineer*: W. J. Haylock. *Annual subscription*: £2 2s. *Entrance fee*: £3 3s. Club controlled by General Purposes Committee representing private and C.A.G. members equally. *Rates* (*normal*): £2 5s. per hour dual, £1 10s. solo. *Rates* (*C.A.G.*): Normal.

LONDON TRANSPORT (CENTRAL BUSES) SPORTS ASSN. FLYING CLUB, Broxbourne Aerodrome, Nazeing, Essex. *Secretary and Manager*: A. Edgar Kefford. *Chief Instructor*: Al. Kirkby. *Assistant Instructor*: F. Dawson Paul. *Chief Engineer*: Peter F. Gordon. *Annual subscription*: £1 6s. (6d. weekly). No entrance fee. This club is exclusive to employees of Central Bus section of London Transport only, and C.A.G. membership is confined to full members of Club, which was founded 17.9.1931. *Rates* (*normal*): 8s. per hour dual and solo. First 3 hours solo free for renewal or issue of licence. *Rates* (*C.A.G.*): 3s. per hour dual or solo.

REDHILL FLYING CLUB, LTD., Redhill Aerodrome, Redhill, Surrey. *Secretary*: Maurice S. Houdret. *Chief Instructor*: A. J. Mulder. *Assistant Instructors*: J. K. Maxwell, P. S. Clifford, H. S. Whittaker, H. T. Molyneux, and (hon.) A. G. Douglas. *Chief Engineer*: F. Bevilaqua. *Annual subscription*: £2 2s., no entrance fee. *Rates* (*normal*): Moths, £2 per hour dual, 30s. solo; Moth Minors, £2 dual and solo. *Rates* (*C.A.G.*): 5s. week-ends and weekdays.

ROMFORD FLYING CLUB, Romford Aerodrome, Colchester Road, Harold Park, Romford. *Flying centre*: Chigwell Aerodrome, Forest Road, Chigwell, Nr. Romford. *Secretary*: (General) C. F. Newman; (C.A.G.) Capt. F. A. Mason, M.V.O., T.D. *Chief Instructor*: S. C. Smith. *Assistant Instructors*: R. F. Graesser, K. Garston-Jones, W. Hampton, Mrs. J. A. Patterson (Gapan "B" test observer), Miss J. Hughes and Miss M. W. Gore. *Chief Engineer*: A. G. Carey. *Annual subscription*: £1 1s., C.A.G. Associates 2s. 6d. *Rates* (*normal*): Dual, £2 per hour, solo, 30s. *Rates* (*C.A.G.*): Normal.

THE ROYAL AIR FORCE FLYING CLUB, Hatfield Aerodrome, Hatfield, Herts. *Secretary*: F/O. R. G. Weighill. No flying instruction is given; membership limited to past and present officers of all branches of the R.A.F., Dominion Air Forces, R.N.A.S. and R.F.C. *Annual subscription*: £2 for Service members, £4 for Reserve members. *Entrance fee*: £2 (Service) and £4 (Reserve). *Rates*: £1 an hour.

**LUTON.**—LUTON FLYING CLUB, LTD, Municipal Airport, Luton, Beds. *Secretary*: E. K. Brodrick. *Chief Instructor*: S. F. Woods. *Assistant Instructors*: J. A. Harrington and Gl. A. Dudeney. *Chief Engineer*: A. Witcomb. *Annual subscription*: £1 1s. No entrance fee. *Rates* (*normal*): £2 per hour dual, £1 10s. solo. Contract rates. *Rates* (*C.A.G.*): Normal.

**MAIDSTONE.**—WEST MALLING AERODROME, Kent. *Secretary*: W. G. Laidlaw. *Chief Instructor*: G. W. Harrison. *Assistant Instructors*: R. M. Pepper and W. B. Henn. *Chief Engineer*: H. C. Rose. *Annual subscription*: £2 2s. No entrance fee. *Rates* (*normal*): 35s. per hour dual or solo week-days, 37s. week-ends. *Rates* (*C.A.G.*): 5s. at all times.

**MANCHESTER.** — THE LANCASHIRE AERO CLUB, Avro Aerodrome, Woodford, Ches. *Secretary*: P. H. Bracegirdle. *Chief Instructor and Manager*: F/O. W. L. Woodward. *Assistant Instructor*: F/O. A. C. Richardson. *Chief Engineer*: W. D. Blackburn. *Annual subscription*: (flying) £4 4s., (ordinary) £3 3s., (country) £1 1s. (no entrance fee). *Rates* (*normal*): 30s. per hour dual and solo. Instruction for "A" and "B" licences and blind flying. *Rates* (*C.A.G.*): Normal.

NORTHERN AVIATION SCHOOL AND CLUB, LTD., Barton Airport, Manchester. Reorganisation and re-equipment in progress.

**NEWCASTLE - ON - TYNE.** — NEWCASTLE-UPON-TYNE AERO CLUB, LTD., Municipal Airport, Kenton, Newcastle-upon-Tyne. *Hon. Secretary*: F. L. Turnbull. *Chief Instructor*: W. M. Mackay. *Assistant Instructors*: F. D. Wallace, M. A. Fraser and M. A. S. Roberts. *Chief Engineer*: H. Ainsworth. *Annual subscription* (from 29/2/40): Pilots, £3; Pilots from H.M. Services, £2; social, £2. *Entrance fees*: Pilots, £3; associate, £1. *Rates* (*normal*): Dual, £1 15s. per hour; solo, £1. *Rates* (*C.A.G.*): 5s. at all times.

**NORTHAMPTON.** — NORTHAMPTONSHIRE AERO CLUB, Sywell Aerodrome, Northampton.—*Secretary*: W. Parry. New instructors now being engaged. *Chief Engineer*: J. Gallagher. *Annual subscription*: Flying members (including membership of associated clubs), £4 4s.; local flying members, £2 2s.; Associate members, £2 2s. *Rates* (*normal*): 30s. per hour dual and solo. *Rates* (*C.A.G.*): Normal.

**NORWICH.** — NORFOLK AND NORWICH AERO CLUB, LTD., Municipal Airport, Norwich. *Secretary*: J. F. Taunton. *Chief Instructor*: Baron D. R. C. B. de Sarigny. *Assistant Instructors*: Flt. Lt. L. G. Gray and A. C. L. Mills. *Chief Engineer*: W. G. Carter. *Annual subscription*: Flying members, £2 2s.; associate, £1 1s. (no entrance fee). *Rates* (*normal*): Dual, 35s. per hour; solo, 30s. *Rates* (*C.A.G.*): 5s. at all times.

**NOTTINGHAM.**—NOTTINGHAM FLYING CLUB, Tollerton Aerodrome, Nottingham. *Secretary*: Mr. R. Sansom. *Chief Instructor*: Flt. Lt. N. A. West. *Assistant Instructors*: Mr. E. K. Lee and Mr. S. Love. *Chief Engineer*: Mr. R. Fullerton. *Annual subscription*: £1 1s. *Rates* (*normal*): Dual, £2 per hour; solo, £1 10s. and £1 16s. *Rates* (*C.A.G.*): Normal.

**OXFORD.**—OXFORD FLYING CLUB, Kidlington Aerodrome, Oxford. *Secretary*:

J. Tunstall. *Chief Instructor and Manager*: G. Goodhew. *Assistant Instructors*: R. Beverley and J. Gregory. *Chief Engineer*: J. Reoch. *Annual subscription*: 5s. *Rates* (*normal*): 30s. per hour, dual and solo. *Rates* (*C.A.G.*): 5s. at all times.

WITNEY AND OXFORD AERO CLUB, Witney Aerodrome, Minster Lovell, Oxon. *Manager*: M. Goring Benge. *Chief Instructor*: Mrs. B. S. Macdonald. *Assistant Instructors*: J. S. Fegan and D. Sorour. *Chief Engineer*: H. H. Martin. *Annual subscription*: £2 2s. No entrance fee. *Rates* (*normal*): Dual, 37s. 6d. per hour, solo, 30s. Special contract rates. Instruction for G.E.'s and 2nd class navigators' licences. *Rates* (*C.A.G.*): 5s. at all times.

**PERTH.**—STRATHTAY AERO CLUB, LTD., 1, Charlotte Street, Perth. *Flying Centre*: Perth Municipal Aerodrome. *Secretary*: Mr. Andrew M. Mackay. *Chief Instructor*: Miss Margaret M. Cunnison. *Assistant Instructors*: Messrs. G. C. Halley, J. G. Hay, D. F. Cargill and R. E. Stevenson. *Chief Engineer*: Mr. W. A. Proctor. *Annual subscription*: Pilots, £4 4s.; associate, £1 1s. *Entrance fee*: Pilots, £2 2s.; associate, £1 1s. *Rates* (*normal*): £2 per hour dual, 30s. solo. *Rates* (*C.A.G.*): 5s. week-days and week-ends.

**PETERBOROUGH.**—PETERBOROUGH FLYING CLUB, LTD., 7, Park Lane, London, W.1. *Flying Centre*: Horsey Toll, Fancet, Peterborough. *Secretary*: C. J. Bradley. *Chief Instructor*: J. R. King. *Assistant Instructor*: J. Brady. *Chief Engineer*: W. J. Meacock. *Annual subscription*: 10s. 6d. *Entrance fee*: 10s. 6d. *Rates* (*normal*): Swallows, £2 per hour dual, £1 10s. solo; Ely and Aeronca, £1 10s. dual, £1 solo. *Rates* (*C.A.G.*): 5s. all types, all times.

**PORTSMOUTH.**—PORTSMOUTH AERO CLUB, LTD., City Airport, Portsmouth. *Secretary*: E. E. Wareham. *Chief Instructor*: F/O. H. Mitchell. *Assistant Instructor*: Flt. Lt. R. C. M. B. Milne, D.F.C. *Chief Engineer*: H. Langford. *Annual subscription*: Flying, £2 2s.; non-flying, £1 1s. *Entrance fee*: Flying, £2 2s.; non-flying, £1 1s. *Rates* (*normal*): Subsidised, dual £2 per hour, solo £1 10s.; non-subsidised, dual £3, solo £2 10s. "A" and "B" licence and instructor's courses. *Rates* (*C.A.G.*): 5s. at all times.

THE YAPTON AERO CLUB, LTD., City Airport, Portsmouth, Hants. *Secretary*: T. G. Miller. *Chief Instructor*: D. F. Holland. *Assistant Instructor*: F. G. S. Wilson. *Chief Engineer*: W. H. Llewellyn. *Annual subscription*: Flying, £2 2s.; associate, £1 1s.; country, £1 1s.; day, 5s.; three months, £1 3s. 6d. *Entrance fee*: Flying, £2 2s.; associate, £1 1s.; C.A.G., 2s. 6d. *Rates* (*normal*): Subsidised, dual £2 per hour, solo £1 10s.; unsubsidised, dual £3, solo £2 10s. *Rates* (*C.A.G.*): 5s. at all times.

**READING.**—READING AERO CLUB, Falcon Hotel, Woodley Aerodrome, Berkshire. *Flying centre*: Woodley Aerodrome. *Secretary*: Flt. Lt. Tommy Rose. *Chief Instructor*: Flt. Lt. Tommy Rose. *Assistant Instructors*: Mr. P. H. Dawson and Mr. J. M. M. Thompson. *Chief Engineer*: Mr. B. J. Davies. *Annual subscription*: £1 1s. No entrance fee. *Rates* (*normal*): £2 per hour dual and solo. *Rates* (*C.A.G.*): Normal.

**SALISBURY.**—WILTSHIRE SCHOOL OF FLYING, LTD., High Post Aerodrome, Salisbury, Wilts. *Secretary*: J. E. Doran-Webb. *Chief Instructor*: M. F. Ogilvie-Forbes. *Assistant Instructors*: A. W. Lincoln, D. H. McBeath and H. P. Aiken. *Chief Engineer*: H. H. Greig. *Annual subscription*: £1 1s. *Rates* (*normal*): Dual, £2 per hour; solo, £1 10s. *Rates* (*C.A.G.*): 5s. at all times.

**SCARBOROUGH.** — THE GANTON FLYING CLUB, LTD., The Aerodrome, E. Heslerton, E. Yorks. *Secretary*: J. R. Micklethwait. *Chief Instructor*: L. C. Hilditch. *Assistant Instructor*: J. R. Micklethwait. *Chief Engineer*: V. Serveau. *Annual subscription*: £1 (no entrance fee). *Rates* (*normal*): £2 per hour dual, £1 10s. solo. *Rates* (*C.A.G.*): 5s. per hour.

**SHEFFIELD.** — SHEFFIELD AERO CLUB, LTD., 2, Bank Street, Sheffield. *Flying centre*: Firbeck Aerodrome, Nr. Worksop. *Secretary*: Percy E. Smith, F.C.A. *Chief Instructor*: Wm. C. Carswell. *Assistant Instructors*: M. G. Bircham, L. A. K. Halcomb and D. A. Senior. *Chief Engineer*: P. J. Munday. *Annual subscription*: £3 3s. *Entrance fee*: £1. *Rates* (*normal*): Dual, £2 per hour; solo, £1 12s. 6d. *Rates* (*C.A.G.*): Normal.

**SOUTHAMPTON.** — AIR SERVICE TRAINING, LTD., Hamble, Southampton (branches at Ansty and Baginton, nr. Coventry; civilian training at Hamble only). *Commandant*: Group Capt. R. J. F. Barton, O.B.E. *Secretary*: Mr. E. C. Evans. *Chief Instructor* (at Hamble): Sqn. Ldr. H. F. Jenkins, A.F.C. *Assistant Instructors*: Some eighty at the three centres, including flying, ground, senior instructional staff. *Rates*: Courses are of various duration—from 3 weeks to 3 years—and are available for civilians and foreigners. Training includes that in flying, wireless, engineering and navigation.

HAMPSHIRE SCHOOL OF FLYING, LTD., Southampton Airport. *Managing Director*: W. L. Gordon. *Chief Instructor*: T. A. Stewart. *Assistant Instructors*: C. G. Hancock and D. P. Chaldecott. *Chief Engineer*: W. Dunning. *Annual subscription*: £3. *Entrance fee*: £1 1s. *Rates* (*normal*): Dual, £2 per hour; solo, £1 15s. *Rates* (*C.A.G.*): 5s. at all times, weekdays and week-ends.

**WALSALL.**—SOUTH STAFFS AERO CLUB, The Aerodrome, Aldridge Road, Walsall. *Secretary*: (Club) E. Turley, (Company) E. W. Langley. *Chief Instructor*: F/O. C. M. D. Chambers. *Chief Engineer*: M. R. Mandviwalla. *Annual subscription*: £2 2s. (no entrance fee). *Rates* (*normal*): Dual £2 per hour, solo £1 7s. 6d. *Rates* (*C.A.G.*): Normal.

**YORK.**—YORKSHIRE AVIATION SERVICES COUNTRY CLUB, LTD., Municipal Aerodrome, York. *Secretary*: C. W. Croxford. *Chief Instructor*: C. W. Croxford. *Assistant Instructors*: I. D. Forbes-Proctor, Roy Barrowclough, Clifford K. Carter and Eric L. Barnett. *Chief Engineer*: E. A. Pepper. *Annual subscription and entrance fee*: £2 2s. (country members and C.A.G.), £1 1s. (qualified pilots). *Rates* (*normal*): 35s. per hour dual, 30s. solo. *Rates* (*C.A.G.*): 5s. per hour at all times.

# OFFICIAL CONTROL of METALS

THE Ministry of Supply announces that under the provision of the Defence Regulations, the Minister of Supply has established a control of the iron and steel industry. Licences are required to acquire iron and steel goods and certain raw materials, but provision is made for exemption, by notice, from the necessity to obtain a licence in favour of certain classes of purchasers and/or certain purposes. A notice is being issued concurrently with the Order providing for the exemption of the main classes of first priority users, namely, Government Departments, and purchasers requiring goods for Civil Defence purposes and railway, shipbuilding and coal mining undertakings. Goods forming the subject of existing contracts are also exempt from licensing but may be subject to certain priorities. All purchasers of small quantities of goods (not exceeding 10cwt.) and purchasers from stock-holding merchants for urgent requirements (during a period of 14 days from the date of the Order) are also exempt from licensing. No licences are required for dealing in scrap iron and steel, but a licence is required from the Export Licensing Department of the Board of Trade for the export of scrap iron and steel and for certain iron and steel goods.

Maximum prices are established for the principal iron and steel products. Prices are given in the second schedule to the Order and are basis prices only, extras, rebates, etc., being in accordance with the scales at present ruling. The prices scheduled are those current in the industry, and it is contemplated that they will remain unchanged until October 31st.

Further information may be obtained on application in writing to the Iron and Steel Control, Ministry of Supply, Steel House, Tothill Street, London, S.W.1. Envelopes and letters to be marked "Licensing."

The Minister has also undertaken the control of supplies and prices of aluminium, aluminium alloys and aluminium scrap. Such control will be exercised by a department of the Ministry of Supply entitled the "Aluminium Control."

The Order:—

(1) Prohibits for the time being dealings in and deliveries of aluminium and aluminium alloys, whether virgin or secondary, except in fulfilment of Government contracts or existing written contracts;

(2) Lays down maximum prices for aluminium, aluminium alloys and aluminium scrap.

(3) Prohibits the disposal of aluminium scrap, except through authorised dealers and smelters.

(4) Requires returns of information in regard to aluminium and its manufactures.

Attention is drawn to the fact that the export of raw aluminium, and aluminium scrap, is prohibited except under licence from the Export Licensing Department of the Board of Trade.

Any person who carries on the business of a dealer in or smelter of aluminium scrap who wishes to obtain the necessary authorisation to continue in such business should communicate with the Controller of Aluminium as soon as possible. A list of such authorised dealers and smelters will be issued in due course.

(N.B.—The provisions of the Order do not prevent a consumer of aluminium from re-melting the scrap produced in his own works *for re-use in the same undertaking*).

Attention is drawn to the fact that the conditions under which trading may be carried out are subject and without prejudice to all the powers of requisition. Such requisition, if made, would in no case be at prices exceeding those laid down in the Order.

As soon as circumstances permit, a further Order will be issued under the terms of which consumers will be in a position to apply for licences to obtain aluminium to fulfil new contracts for *essential* civilian uses. When this further Order is made a further notice will be issued.

Any enquiry relative to the Control should be addressed to the Aluminium Control, Ministry of Supply, c/o Postmaster, Shrewsbury, Salop.

# FOR LANDING at NIGHT

## *Rotax - Harley Landing Lamps for Use in Aircraft and with Portable Ground Units*

**In the Rotax-Harley lighting system use is made of the upper half of the beam for lateral illumination. Distance intensity is obtained with the lower half. The building in the distance is 500 yards away from the standard 11in. 12 volt Harley portable unit.**

IT was over seven years ago, when a young and enthusiastic private owner used to arrive at Hanworth after sunset, that the idea of the Harley-Rotax landing light as fitted to aircraft orginally germinated. The enthusiast was one Maldon C. Harley, who at that time found that he could not obtain an efficient landing light suitable for his Gipsy I Moth apart from the usual flares and ground floodlights.

Having a resourceful turn of mind, Mr. Harley worked out for himself the requirements necessary for a small lamp which would illuminate objects in the distance ahead and at the same time possess a reasonable spread of light, yet having a beam with which to check drift when landing

The normal type of lamp producing a conical beam was not, in Mr. Harley's opinion, quite satisfactory. To give the necessary distance the lamp had to be so focused that the beam became substantially parallel with little or no spread. Conversely, if spread was required it could only be obtained at the expense of distance. With the small amount of power available the medium between the two extremes was not entirely suitable from the pilot's viewpoint. Even to-day the available voltage rarely exceeds twelve.

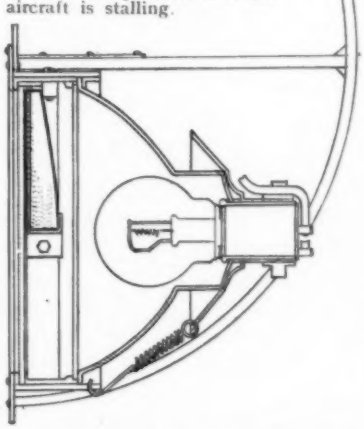
### Controlling the Beam

The light obtained from this type of lamp is in effect conical, a fact which for obvious reasons means that much of the upper half of the beam is not used to illuminate objects on the ground (that is, if the light has been adjusted to shine well forward as required in practice

Because of the limited power available, Mr. Harley rather naturally reasoned to himself, why not make use of the top half of the beam by deflecting it downwards to provide the necessary spread of light from a lamp which would otherwise be focused with a substantially parallel beam to provide the necessary distance intensity. In this way it would be possible to obtain both distance and spread without having to increase the power by any appreciable extent

To control the top half of the beam it was decided to introduce a special lens system to direct the light downwards and at the same time to disperse it laterally. Initial experiments were made with glass and water lenses, sometimes costing as much as £14 apiece. Gradually the Harley ideal became an actual fact. Under actual conditions at Hanworth, measurements were taken to arrive at the required distance and spread of the light. To obtain this a special lens fitted across the top part of the lamp was used in conjunction with a semi-circular diffuser. The lens itself was also semi-circular in shape with a base approximately one inch deep in section. The forward face of this lens gradually tapered back to the circumference in a series of concentric flat surfaces.

The composite light obtained from this lamp was unusual because the lower half of the lamp followed normal practice. The beam produced was strong and substantially parallel, but on account of the lens and its diffuser across the upper half, the light that passed through the lens was bent downwards and forwards, spreading laterally on account of the diffuser. Under actual flying conditions this lamp provided a strong light, having one downward beam with a spread of approximately 30 degrees, together with a powerful and substantially parallel central beam, with which the pilot could effectively keep a check on drift. It had all the advantages of a "pin" point beam, without the usual disadvantages where objects outside the beam cannot be seen. When taking off with the latter type of beam, the light comes off the ground so quickly that a black spot appears and gives the false impression that the aircraft is stalling.



**To control the upper half of the beam and spread it laterally, a special semi-circular lens and diffuser is mounted behind the front glass panel of the Rotax-Harley lamp.**

Since those early experiments the Harley lamp has been developed without interruption. Basically, the principle of the lamp remains the same. However, one or two important modifications have been made. The lens is nowadays fitted, as in the accompanying diagram, with the flat face forwards. The diffuser is placed between the lens and the front glass of the lamp. Incidentally, the lens in section now tapers gradually towards its circumference except, of course, along its base.

Having settled on the principle of the lamp, Mr. Harley and his associates set about tackling other problems connected with its application to aircraft. With an accepted limitation of 12 volts, or perhaps 24 volts, the next problem was to obtain suitable bulbs which would be able to stand up to extremes of temperature and permit the use of filaments with capacities from 150 watts up to 500 and even 1,000 watts, while at the same time having the smallest glass envelope possible under the circumstances.

### Teething Troubles

Early teething troubles were, of course, encountered, but with the co-operation of experts from the G.E.C. Osram people a reliable series of highly efficient bulbs was developed. Obscure cracks in the pinch-seal of the bulb caused by the expansion and vibration of the lead-in wires, fractures of the tungsten filaments due to their brittle nature became a thing of the past. What is more, it became possible to develop bulbs with a second or reserve filament, so positioned that no black spot appears in the beam. For the twin filament bulbs, the Harley research laboratory at Cranford, Middlesex, developed a special double contact pre-focus cap.

It was not long before the lamps were fitted with special mountings to enable the light to be raised or lowered through a wide range of movement by the pilot. In the main the remote control for this type of lamp is obtained with the use of Bowden or Teleflex controls. More recent developments include remote control operated by electrical methods.

## The Industry

Production of this type of lamp was placed in the safe hands of Rotax, Ltd., whose co-operation with Mr. Harley has gone a long way towards its development.

The Rotax-Harley landing lamp is to-day obtainable in a variety of forms. There are at least sixteen types designed for fitting into the leading edge of an aircraft. They vary in size from 6in. diameters to 11in. Others are suitable for recessing into the underside of the wing on quadrants which enable the pilot to lower or retract the lamp at will. There are also many types which can be fitted into the leading edge of an aircraft and at the same time can be

The fully retractable type HO.7 8in. Rotax-Harley lamp.

dipped by means of remote controls.

Because it is not always convenient to install the ordinary lamp in the underside of the wing (it should be as near the wing tip as possible) owing to lack of space or the fouling of internal bracing, special lamps with shallow reflectors have been developed. In the case of the type 8K lamp with an 8in. reflector the overall depth has been reduced to 4¾in. This lamp is swung, partly balanced, in a housing which forms a means of fixing it to the wing structure, sealing the wing and carrying the operating mechanism and terminal block in one unit. Yet the weight is only 7¾lb. This lamp is designed for 250-watt bulbs when used with a 12- or 24-volt system, but where a generator is not fitted bulbs of 150 watts are in certain cases supplied.

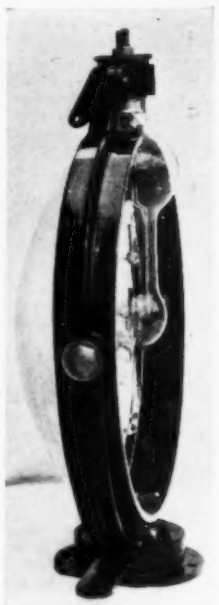
Because aircraft electrical systems are subject to fairly substantial drops at even nominal rates of discharge, it is important to ascertain the correct voltage available at the terminal block. For this reason it is usual to install bulbs rated at a slightly lower voltage than that of the system used.

In the type 8K lamp the offset of the beam may be altered to suit individual requirements by rotating the lamp a few degrees to the left or right before finally securing the unit in the wing. With this lamp the composite beam has a wide spread and great distance intensity, enabling objects on a clear night to be seen 500 yards or more away. If a twin filament bulb is used the main filament should be employed only for taking off and landing. For taxi-ing, and on all occasions when the lamp is required to be lighted for periods in excess of three minutes, the secondary filament should be used to ease the load on the battery caused by the heavy amperage of the main filament.

The latest Harley lamps are the 1,000-watt and 1,200-watt universally mounted projectors for use as seaching lights when fitted to large aircraft. They are, of course, also suitable for landing and take-off and are designed to be fitted into the nose, fuselage or leading edge. The two lamps are known as Models 13Y and 14Y. The former has a shallow reflector with a depth of only 4in. from the pivot centre. The lamps are mounted on ball bearings and will burn for long periods when mounted vertically. An important use for these lamps (more especially for the Model 14Y) is the observation of the ground at night. They are designed to overcome the difficulty of a glowing filament being observed from the ground after switching off. In the case of Model 13Y the lamp is turned right over, bringing the back of the reflector between the filament and the ground. With Model 14Y, which is mounted to shine only in a downward direction from a position in the undersurface of the fuselage, there is a special shutter which is instantaneous in use and controlled in conjunction with the switch.

An additional application of the Harley lighting system is to be seen in the introduction of a special portable self-generating unit. A 240-watt lamp is mounted on a column attached to a small portable platform which carries a 12-volt accumulator and a little compact generator unit driven by an air-cooled Johnson petrol engine. This unit, which can be started by merely switching on the lamp, provides a powerful beam to assist aircraft when landing at night. A small secondary beacon emitting a red light is on top of the main lamp.

There is also a practical A.R.P. or fire fighting portable unit, having a powerful searchlight and attachments for head lights for illuminating dug-outs, tents, tunnelling, etc.



The latest addition to the Rotax-Harley range is the Model 13Y, with a 1,000 watt lamp. To avoid observation of the glowing filament from the ground after switching off, the lamp and reflector is turned over.

To-day it must be pleasant for Mr. Harley to reflect that only seven years ago he started experiments on a type of lamp that at the present time is fitted to the majority of British civil and military flying boats, large commercial aircraft and many Royal Air Force types.

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## New Medium-high Carbon Steel Electrode

WITH the object of making it possible to build up worn steel parts, and to improve the wear-resisting properties of low-carbon steel surfaces, the Lincoln Electric Co., Ltd., of Welwyn Garden City, Herts, has produced a new medium-high carbon steel electrode known as Hardweld 50. This new electrode, it is claimed, produces a tough, dense medium carbon steel deposit which has considerable resistance to deformation and wear, while at the same time it is "machineable" at slow speeds.

In general, when deposited on straight carbon steel and allowed to cool naturally, the hardness of the deposit will be approximately 230-330 Brinell. The exact hardness, however, depends somewhat on the rate of cooling and the analysis of the steel on which it is deposited. The deposit may be hardened by the usual water quench from above approximately 1,500 deg. F. or by flame hardening methods. Incidentally, Hardweld 50 can be used for vertical welding, but for best results the work should be fairly horizontal.

Another recent innovation announced by the Lincoln Electric Co., Ltd., is the publication of a book entitled *Simple Blueprint Reading with Particular Reference to Welding and Welding Symbols*.

While this book has been compiled primarily for welders, it contains information of value to anyone concerned with mechanical construction. As the title suggests, its objects is to provide information and instruction on the reading of blueprints and drawings and it is hoped that its contents will enable the welder to pick up in a few hours' spare time what would normally take many months in the ordinary course of everyday work. The book is obtainable from the Lincoln Electric Co., Ltd., price 3s. 6d., post paid.

## Swiss Machine Plant

THE Broadway Engineering Co., Ltd., of Carlisle Road, London, N.W.9, have been appointed agents in this country for Christen and Co., A/G., of Berne, Switzerland.

Christen and Co. are well known for their very complete range of high speed drilling and tapping machines, millers, universals and precision lathes. The company also makes special purpose machines, small horizontal and vertical millers for optical industries, etc.

The range also includes automatic machines of all types.

## Changes of Address

A GREAT many notifications have been sent to us during the last few days informing us of the transfer of businesses to provincial or rural districts. It is pointed out that in the national interest *Flight* cannot publish details of such changes, but we welcome the notices nevertheless, as they are essential to our maintaining contact with firms which have moved and will assist us in dealing with any enquiries which we may receive.

It should be pointed out that enquiries of this nature cannot be dealt with over the telephone but must be in writing.